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Contents

Health, Education, and Welfare

- Lean in the Public Sector: Driving Improvements in Idaho's Food Stamp Program** 1
Patrick W. Shannon, Russell Barron

Economic Development, Innovation, Technological Change, and Growth

- A Systems View to IT Policy in Developing Countries: An Example from Venezuela** 12
Carmen Reaiche

International Economics

- Analysis of Energy Integration and the Transboundary Superstructure in South America** 21
Miguel Edgar Morales Udaeta, Vinicius Oliveira da Silva, Luiz Claudio Ribeiro Galvão, Fernanda Neri de Souza
- Country Risk Analysis in Emerging Markets: The Indian Example** 44
Sankarshan Basu
- Expatriates in Luxembourg: How to Cope with Cultural and Linguistic Specificities?** 58
Ursula Schinzel

Mathematical and Quantitative Methods

- Evaluating Distribution Centers via a Maximizing Set and Minimizing Set Based Fuzzy MCDM Approach** 73
Ta-Chung Chu, Wei-Chun Hsu

Business Administration and Business Economics; Marketing; Accounting; Personnel Economics

The Impact of Sexual Orientation on Consumers' Tipping Behavior 86

Monica Popa, Shayne Hurd

**E-complaint Services for Consumer Goods. Results from an Empirical Analysis in
Italian Supermarkets** 97

Monica Popa, Shayne Hurd

Sustainability Risk and Crisis Management: The Taoism's Perspective 104

Liangrong Zu, Hualiang Lu

Impact of Financial Reporting on Access to Capital 125

Elene Kharabadze, Ioseb Mamukelashvili

**Corporate Social Responsibility and Accounting Credit — Based on the Case of
Hainan Honz Pharmaceutical Co.** 140

Lu Sun, Ting-ting Zhang, Rong-guang Chen, Chunyan Pu

**The Integration of Disabled People into the German Labor Market — How the Workplace
Health Management Is Able to Complement the Existing Tools** 148

Matthias Reich, Jürgen Fonger

**Perception Management: A Strategy for Effective Decision Making and Productive
Managerial Performance in Business Organizations: A Survey of Selected Manufacturing
Firms in Nigeria** 155

Sev. Joseph Teryima, Ugba Vivien Anna

Agricultural and Natural Resource Economics

Contingent Valuation Method (CVM) for Agricultural Wastes in Greece 174

Odysseas Kopsidas, Leonidas Fragkos-Livanios

Feasibility of Developing Crop Revenue Insurance in Chinese Regional Economies 180

Youyang You

Lean in the Public Sector: Driving Improvements in Idaho's Food Stamp Program

Patrick W. Shannon¹, Russell Barron²

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Abstract: Building off of lessons learned from the Toyota Production System (TPS), many North American manufacturers have successfully implemented lean business practices. For these organizations, the lean philosophy has resulted in improved competitive positions by eliminating and reducing waste, driving down costs, reducing lead times, and improving quality. The lean trend has also taken hold in non-manufacturing, private sector organizations, and even more recently in public sector organizations. This paper presents a case study of a successful lean implementation at the Food Stamp Program in the State of Idaho. Prior to the lean implementation, Idaho's Food Stamp program ranked near the bottom of the 50 U.S. states on virtually every key metric and was not meeting the needs of the Idaho citizens. The article discusses the lean strategies used by Idaho Department of Health and Welfare (IDHW) leaders to transform the Food Stamp Program into one that now ranks at or near the top of all states with respect to key performance metrics. The lean implementation approach implemented by the IDHW leaders demonstrates the power of the lean management philosophy.

Key words: food stamp program; lean; process improvement; public sector; value stream map

JEL codes: I3, L3

1. Introduction

"*The Machine That Changed the World*" (Womack, Jones & Roos, 1991), the outcome of the Massachusetts Institute of Technology research project that compared the automobile industries in Japan, Europe and the United States, is often cited as the work that propelled the concept of lean manufacturing to the forefront in America. The lean movement is rooted in the Toyota Production System (TPS). Many articles and books, such as "*The Toyota Way*" by Liker (Liker, 2003), describe the TPS which revolves around the desire to eliminate waste throughout the organization.

The lean movement has become solidly established in the American manufacturing sector. There are numerous lean success stories involving manufacturing companies who have substantially reduced rework, shortened process lead times, reduced inventory levels, increased product quality, and in general, improved their ability to compete in the global marketplace (Lewis, 2008; Stone, 2012).

However, the lean management philosophy has also moved into services, administrative departments, and

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even the public sector. Lean methods have been applied to improve IT services in both private and public organizations (White & Chaiken, 2008). The Connecticut Department of Labor has used the lean philosophy, principles and practices to improve departmental processes and eliminate wastes, resulting in improved satisfaction of both internal and external customers of its services (Hasenjager, 2006).

Other papers have been published in recent years that describe how lean thinking can be implemented in the public sector or which recount examples of lean implementation successes (Sanderson & Ramakrishan, 2007), (Bagely & Lewis, 2008). However, governmental organizations can face challenges that don't necessarily exist in the private sector. For example, governmental organizations may be required to balance such factors as administrative laws and externally mandated process requirements in order to effectively apply lean methods (Scorsone, 2008).

This paper describes the successful implementation of lean concepts and practices by employees within the Idaho Department of Health & Welfare's Food Stamp Program. Prior to the lean implementation, the Idaho program was failing in many ways and was ranked near the bottom of all states on key measures used by the federal government to evaluate Food Stamp Program administration. Within four years following the launch of the lean initiative, Idaho's performance was at or near the top of all key federal metrics and is now considered a benchmark program for other states. This paper describes the steps that were taken, and the challenges that needed to be overcome, to improve the services to the citizens who rely on Food Stamps.

2. Background

Although the United States is a wealthy country, food insecurity is a major problem. Addressing that problem began with the Food Stamp Act of 1964, signed into law by President Lyndon Johnson to provide improved levels of nutrition among low income households. Just over 33 million adults and 16 million children in 2012 were purported to be food insecure according to the organization, Feeding America¹.

Just over 500,000 people received Food Stamps in 1965. Within 10 years, the number of Food Stamp recipients had grown to 15 million and by 2014, 46.5 million Americans participated in the Food Stamp Program now known as the Supplemental Nutrition Assistance Program (SNAP), receiving over \$70 billion in benefits. The number of participants has more than doubled in the past 10 years while the benefits distributed have almost tripled².

Idaho, a relatively large state geographically that is sparsely populated with just over 1.6 million residents in 2014, has seen the demand on its Food Stamp program increase at extraordinary rates in recent years. Figure 1 shows the growth in the number of food stamp participants and illustrates the correlation between demand for food stamps and the rate of unemployment in Idaho.

The challenge facing Idaho and all states is to assure that those who qualify for the SNAP program receive assistance in a timely and cost-effective manner, while making sure that benefits are not incorrectly granted to those who don't qualify. This is made especially challenging because federal and state rules regarding eligibility are complex and require special expertise on the part of the service providers at IDHW and participation by the applicants. As with any service situation, delivering high-quality service is challenging due to the many sources of variability that can impact the service delivery process.

¹ http://www.feedingamerica.org/hunger-in-america/impact-of-hunger/hunger-and-poverty/?_ga=1.176088546.1780125413.1422289281.

² United States Department of Agriculture: <http://www.fns.usda.gov/pd/supplemental-nutrition-assistance-program-snap>.

The Supplemental Nutrition Assistance Program

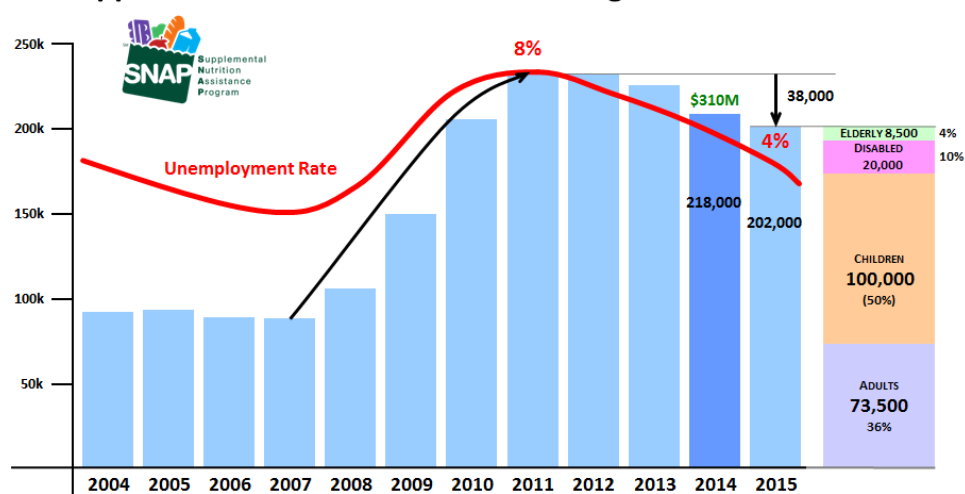


Figure 1 Idaho Food Stamp Program Participants

3. The Idaho Food Stamp Program — Pre-2008

Probably the best way to describe the Idaho Food Stamp Program in the years prior to 2008 is a program in a “state of crisis”. The Food Stamp application and delivery processes were ineffective, and the IT systems that supported the program were woefully out of date and inadequate.

In the years leading up to 2008, performance was poor. In 2007, the average time to approve an application exceeded 19 days, with only 3 percent of all applications approved the same day they were received. When compared with the other states, Idaho’s Food Stamp Program didn’t fare well on most federal metrics as shown in Figure 2.

For example, in 2005 Idaho ranked 48th in Payment Error Quality with an error rate of 8.34 percent. That same year, Idaho was 45th (up from 50th in 2004) on a measure called negative error, which is calculated by dividing the number of invalid cases that Idaho had approved by the total number of cases audited. Not only was Idaho making a relatively high volume of errors in the amount of Food Stamp dollars allocated and denying applications or closing cases in error, it was getting worse in the timeliness in processing applications. In 2004 Idaho ranked 29th in the percentage of Food Stamp applications processed within the federal limit of 30 days. By 2007, the state was ranked 48th with only 80 percent of applications meeting the federal limit.

| Year | National FNS Measures | | | | | |
|--------------------|-----------------------|------------------|-------------------|------------------|---------------|------------------|
| | QC Payment Error | | QC Negative Error | | QC Timeliness | |
| | Rate | National Ranking | Rate | National Ranking | Rate | National Ranking |
| 2004 (sanction) | 9.05% | 51st | 13.22% | 50th | 90.41% | 29th |
| 2005 (sanction) | 8.34% | 48th | 10.68% | 45th | 86.79% | 37th |
| 2006 (bonus) | 4.64% | 18th | 7.67% | 39th | 83.06% | 43rd |
| 2007 | 4.44% | 18th | 5.20% | 26th | 80.00% | 48th |

Figure 2 Idaho Performance Metrics – Pre 2008

Idaho's Food Stamp Program performance was so bad that the state was faced with financial sanctions requiring the state to pay back administrative funds to the federal government. The performance standard at IDHW had deteriorated to the point where the federal government's 30 day limit was thought of as the goal. The following statement from Lori Wolff, then Deputy Administrator for the Division of Welfare, provides an insight into this mentality.

"I recall going into our field offices and the process would go something like this: Somebody would say, 'I want to apply for food stamps.' They would be handed an application, give it to a clerk and then an interview would be scheduled seven to 10 days later. The person would come back a week later, wait for about 40 minutes, talk to a decision-maker in a 45-minute interview, and then we would give them a list of materials we would need. The applicant would mail them in within five to seven days later. We're already 20 days later. We would process it within five days after that and, best case, we're right at about 30 days."

Between 1994 and 2007, applications for Food Stamps in Idaho ranged between 40,000 and 60,000 per year. However, as Idaho's economy began to suffer along with the rest of the country, IDHW leaders knew that demand for all of their services including Food Stamps would be increasing at the same time the Idaho State Legislature was planning budget cuts (translating into staff reductions) for the department. Given the department's already poor performance with the Food Stamp Program, changes were needed. In addition to some changes in management in early 2007, IDHW embarked on a lean operations and continuous process improvement implementation.

4. Lean Operations

Lean is a management philosophy that focuses an organization on eliminating wastes throughout the entire value stream.

Whether in the public or private sector, successful lean implementation requires strong leadership to help develop a supportive and participative culture. Resistance to change is natural and should be expected; it can occur at all levels of an organization. But in our experience, a successful lean implementation can't occur if the upper leadership is not fully on board and participating in the effort. Their leadership must guide the organization to be relentlessly focused on the customer making sure that the first consideration of any potential process or system change is whether the customers' *perceived value* will be increased by the change. In the broadest terms, perceived value is defined as follows:

$$\text{Perceived Value} = \frac{\text{Customer Benefits}}{\text{Cost}}$$

Perceived value is increased by either improving (increasing) customer benefits, or reducing the cost of the products or services, or some combination of the two. The benefits typically involve three main areas:

- (1) Desirableness of the products or services
- (2) Quality of the products or services
- (3) Delivery timing of products and services.

The numerator (customer benefits) is increased by providing product or service improvements thereby making the product or service more desirable or useful, by improving the quality of the product or the service experience, and/or by reducing the lead time between the "order" and the completion of the transaction. The denominator (cost) is decreased by reducing or eliminating material or labor waste, with some of those savings

passed on to the customer in the form of price reductions.

The lean philosophy can effectively address both the benefit and cost portions of the perceived value equation through the application of a host of tools and techniques that have been applied in a large number of manufacturing and non-manufacturing settings. Tools such as Value-Stream Mapping, 5S, Standardized Work, Theory of Constraints, Plan-Do-Check-Act, Visual Management, and Batch Size Reduction are just a few. A very good overview of these and other lean tools is contained "Lean Methods Guide" published by the Environmental Protection Agency³. (Note 3).

A key to successful lean implementation and continuous improvement is the selection and alignment of key metrics. Dave Packard, one of the founders of the Hewlett-Packard, is noted for saying that "people do how they are measured." We subscribe to the belief that improvement will not happen without proper measurement. These measures are the "Drivers of Success" and as illustrated in Figure 3. These drivers can be classified into three categories; customer focused, production focused, and process focused. Some potential measures within each category are also shown in Figure 3.

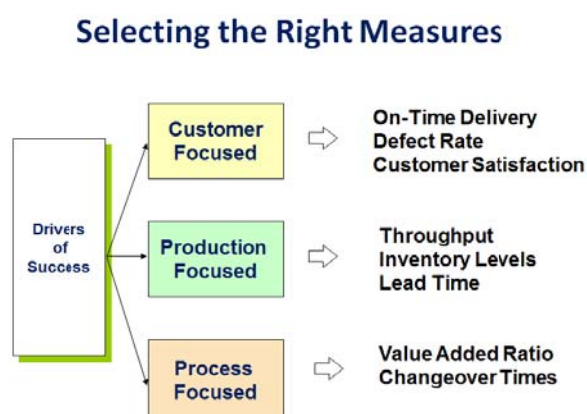


Figure 3 Measures that Drive Success

It is important that the measures be aligned. To illustrate, when considering the Idaho Food Stamp Program's application process, we might choose one measure from each category-customer satisfaction, lead time and the value-added ratio:

Customer Satisfaction: Because people apply for Food Stamps when they need a means to acquire food for themselves and their family, their satisfaction with the program is higher when they receive the Food Stamps soon after applying. Satisfaction is also related to their perception of how they are treated by the IDHW staff. Customer satisfaction can be measured by surveying Food Stamp customers.

Lead Time: Lead Time is the time from initial application for assistance to a customer receiving Food Stamp benefits. This is measured in days.

Value-Added Ratio (VAR): The ratio of time spent on value-added activities over the total lead time. A value-added activity is considered to be anything that benefits the customer. A high VAR is desirable.

These three measures are aligned and can be used to drive improvement in the Food Stamp Program application and delivery process. By reducing time spent on non-value added activities throughout the process, the VAR is increased and lead time is reduced, thereby increasing customer satisfaction.

³ Lean Government Methods Guide, United States Environmental Protection Agency, <http://www.epa.gov/lean/government>, 2013.

Thus successful lean implementation in any organization requires strong leadership, an understanding of the lean philosophy and the lean tools, and the use of key metrics. But effective lean implementation also requires a system-wide approach, not a piecemeal effort that is focused on isolated improvement projects (Gebre, Hallman, Minukas, & O'Brien, 2012).

4. The Lean Implementation—2008 Foreword

The issues facing the leadership team prior to 2008 centered on Food Stamp application processes. Of specific concern was the lead time; the time it was taking from initial application to an individual receiving benefits. Also of concern was the quality of the decisions being made with respect to Food Stamp applications. Although the IDHW lean implementation effort had been underway since early 2007, Idaho's application process continued to have an average lead time that exceeded 19 days and ranked near the bottom of all the states in key performance metrics. The culture within the department was not customer focused and service quality overall was unacceptable to management.

Beginning in 2008, the state's economic situation started to decline and demand for services by unemployed families began to rise. Over the next few years, the state legislature reduced the department's operating budget because of tax revenue shortfalls due to the economic recession that was gripping Idaho and the rest of the United States. The budget cuts meant that the IDHW was going to have to reduce staff and close several offices in the state.

In an attempt to improve the Food Stamp application process, and to survive the budget cuts, IDHW leadership determined that an increased emphasis on the lean operations paradigm was needed. This meant a cultural transformation to one centered on customer service and waste elimination would need to take place. The culture shift was initiated when the Food Stamp Program leaders met personally with the management and staff at every office throughout the state to share the new lean philosophy and to listen to improvement ideas from these "front-line" employees. These meetings also served as an opportunity to identify the informal leaders at each location who had the potential to influence opinions and actions. These people would prove very important as the lean implementation progressed. A series of key actions were taken.

- Business leaders were engaged to ensure support for the paradigm change
- Staff support was secured and staff provided input to the details of process changes within the new paradigm
- Process level evaluation and certifications were conducted to ensure conformance to the implementation of the new paradigm
- Regular performance reviews were conducted with new metrics supporting the new paradigm to ensure continued improvement and adherence to new standards
- Frequent "cultural conversations" occurred with staff to reinforce and reapply

The lean implementation began by examining the "current state" of the Food Stamp application process as it existed prior to 2008. It was a complex and messy the process. While there are several steps that are mandated by the federal government and important to the State of Idaho, there is no proscribed method for implementing the Food Stamp application process. As the lean implementation team studied this process, it was clear that there were opportunities for improvement. Figure 4 conveys the essence of how the process is supposed to work.

A primary objective of lean is to reduce the time spent on non-value adding activities and eliminate waste. With that in mind, the lean implementation team developed the "future state" process flow shown in Figure 5.

While the original (“current state”) process had evolved to where it was prior to 2008 through many iterations, in retrospect it was focused internally on years of policy interpretations and compliance efforts. This “future state” process was designed with the customer in mind — to reduce the time from initial request for service to when the applicants actually receive Food Stamps, showing respect for the applicants throughout the process.

Eligibility: Requirements and Responsibilities

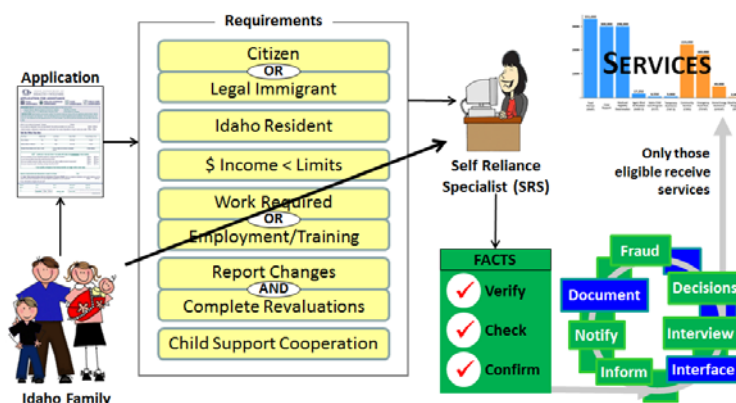


Figure 4 How the Food Stamp Application Process Should Work

The “future state” shown in Figure 5 represents considerable analysis and input from a broad range of IDHW staff and leadership. The result is a process that provided many improvements with significant positive impact on the process metrics. One example of these process changes relates to what happens when an applicant first arrives at an IDHW service facility. The applicant experience under the old process was typically something like the following:

(1) The applicant filled out a form and schedule an application appointment a few days in the future.

(2) If the applicant met the appointment time (about 50% did not), they were sent home with a list of required information and another future appointment date. If the applicant did not meet the appointment, it was rescheduled for a future day.

(3) The applicant would drop off the information to be reviewed. Invariably, the information was found to be lacking—the applicant was notified. The process was repeated until all required information was provided or the applicant dropped out of the process.

(4) IDHW staff made a decision based upon the applicant’s information materials. Approved applicants were scheduled to receive benefits.

(5) Denied applicants could appeal or start a new application.

Thus, the issues surrounding the application process were not so much about waiting time in the IDHW Food Stamp Program offices, it was more about the number of times the applicant had to come to the office — in many instances as often as three times in a two week period. All of this was taking an average of 19 days with many applications taking the 30 day federal maximum or even longer.

An example of the type of process changes reflected in the “future state” flow in Figure 5 is the movement of the “decision-maker” from the back room to the front on the process. Now, at every IDHW service office in the state, the first person an applicant meets with is the staff member who can determine whether the application form is complete, or help the applicant initiate and complete the application process. This person also can make the

eligibility decision immediately in most cases. This one change alone reduced multiple days from the application process. This, and many other similar improvements, have resulted in a drop in Food Stamp application approval, decreasing from a pre-lean average of 19 days to a sustainable average time of 2 days (Figure 6).

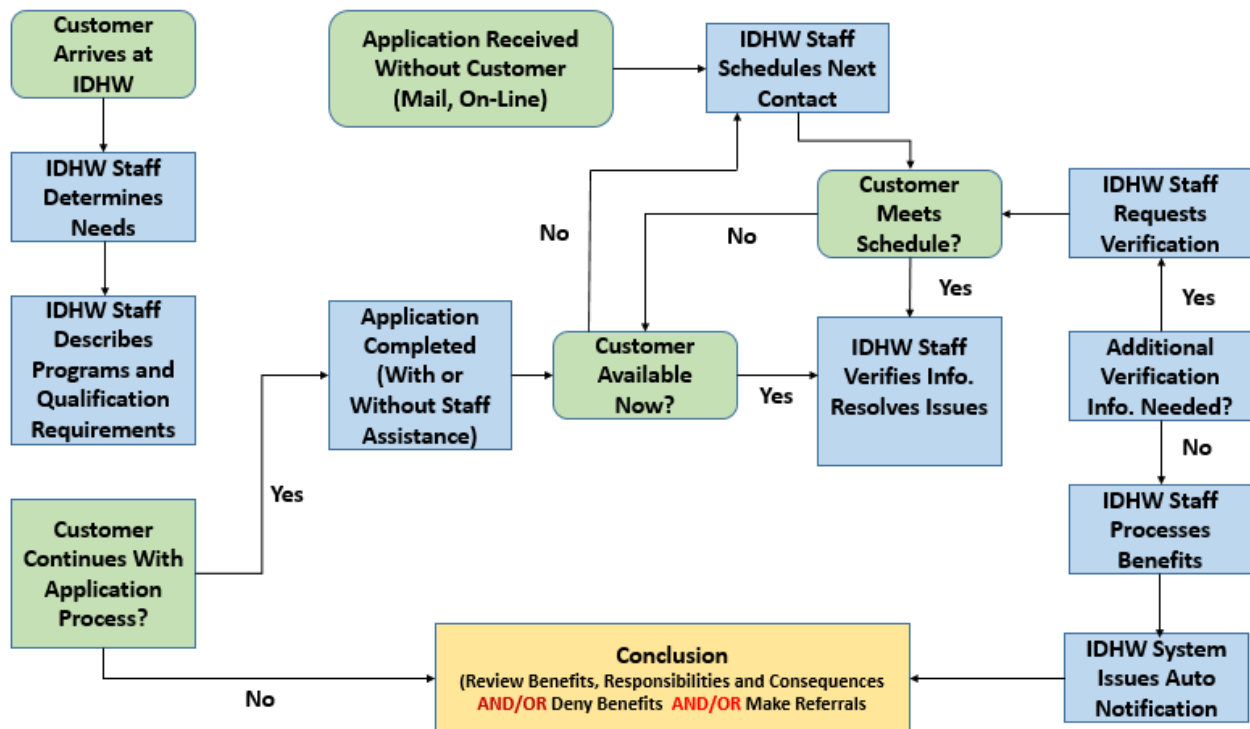


Figure 5 The “Future” Food Stamp Delivery Process

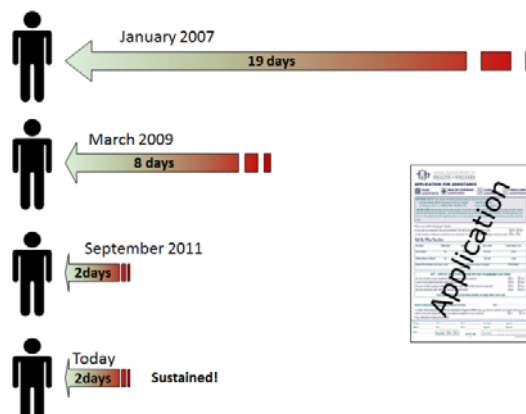


Figure 6 Application Lead Time Improvement

Figure 7 shows that same day approval has increased from less than 3 percent in January 2007 to 82 percent despite the total number of applications more than doubling and staffing levels decreasing.

The impact of the lean implementation in the Idaho Food Stamp Program has had a positive impact on how Idaho ranks nationally as shown in Figure 8. For example, in 2007, Idaho's program ranked 48th nationally in application approval time. By 2012 Idaho was ranked 1st with 99.28 percent of applications being processed within the federal government's 30 day limit and Idaho has ranked 1st on this metric each year since. Figure 8

shows that the improvement in the quality metrics has also been impressive with Idaho ranking in the top 15 states in payment error rate and top 5 in negative error rate. These metrics are all very important to the program's clients reflected by an all-time low rate of customer complaints.

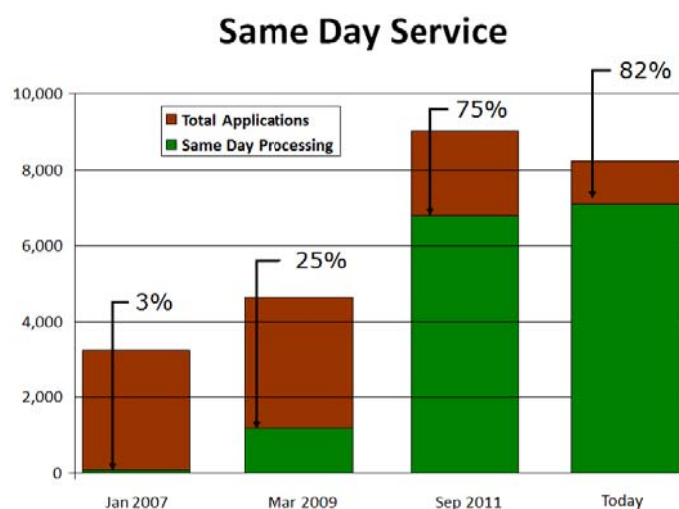


Figure 7 Same Day Processing Results

Sustainable and Improving Performance

| Idaho's Service Delivery Performance for SNAP | | | | | | | | | | |
|---|-----------------------|------------------|-------------------|------------------|---------------|------------------|-------------------------|-------------------------------|------------------------|----------------------------|
| Year | National FNS Measures | | | | | | New Idaho Measures | | | |
| | QC Payment Error | | QC Negative Error | | QC Timeliness | | Admin Cost | Same Day | Days to Approval | Case Management |
| | Rate | National Ranking | Rate | National Ranking | Rate | National Ranking | Dollar cost per Case/Mo | % Approved on Application Day | Average Number of Days | % Tasks Completed = 5 days |
| 2004 (sanction) | 9.05% | 51st | 13.22% | 50th | 90.41% | 29th | | | | |
| 2005 (sanction) | 8.34% | 48th | 10.68% | 45th | 86.79% | 37th | | | | |
| 2006 (bonus) | 4.64% | 18th | 7.67% | 39th | 83.06% | 43rd | | <2% | > 20 | |
| 2007 | 4.44% | 18th | 5.20% | 26th | 80.00% | 48th | \$42.35 | ~6% | 15 | |
| 2008 (bonus) | 3.59% | 12th | 0.72% | 3rd | 91.32% | 16th | 39.20 | ~20% | 11 | |
| 2009 | 2.69% | 11th | 2.76% | 8th | 94.81% | 11th | \$30.72 | ~25% | 8 | |
| 2010 (bonus) | 3.32% | 18th | 2.39% | 6th | 98.24% | 2nd | \$19.80 | 72.2 % | 2 | 96% |
| 2011 (bonus) | 2.52% | 5th | 1.97% | 4th | 99.06% | 1st | \$15.16 | 71.3% | 2 | 99% |
| 2012 (bonus) | 2.49% | 14th | 10.02% | 5th | 99.28% | 1st | \$16.15 | 71.8% | 2 | 98.7% |

Timeliness best in the nation
Good Accuracy (Negative and Positive measures)
Administrative cost per case is one of the lowest in the nation
Customer complaints are at an all time low

Figure 8 Overall Lean Results

These improvements don't happen without the buy-in and support of people throughout an organization. Getting this buy-in is not always easy as was the case within the IDHW. As mentioned previously, communication was a key tool used by the leadership team to explain the need for change.

Lean champions from across the state were recruited to help sway opinion and gain support of the staff in the service centers. For example, the idea of moving the "back room" staff out front to meet directly with customers was not popular. To help move that idea forward, a well-known informal leader and vocal skeptic of past improvement initiatives was engaged in the lean movement. But this time, she began to see that positive changes

were happening. As she gradually started to see things from the customers' perspective she became a supporter and an advocate for the changes which helped sway staff opinion across the state to make this change happen. Other process changes followed a similar pattern. As changes were made and positive results were observed, the push-back became less and support for the lean effort increased.

As mentioned earlier, the economic crisis of 2008 led to budget cuts for IDHW and all Idaho state agencies. As a result, IDHW was forced to reduce staffing levels in all of its programs including Food Stamps. There was a need to consolidate some of the service centers across the state. It should be pointed out that some of these changes were in process prior to the lean implementation, but the recession, and associated budget cuts, created opportunity to build on this foundation. As a result, the layoffs that occurred were strategic and did not impact critical functions. This was all happening as demand for the Food Stamp Program was increasing (see Figure 1). Fortunately, the lean efforts that were undertaken not only significantly reduced the application lead time and improved quality and customer satisfaction, the program improvements resulted in a 70 percent reduction in the monthly cost of administering a case between 2007 and 2012, making Idaho's cost per case one of the lowest costs in the nation (see Figure 8).

6. Conclusions

This article provides an example of how the lean management philosophy was applied in a governmental setting. The leadership at the Idaho Department of Health & Welfare credits the lean approach with transforming the Idaho Food Stamp Program from one of the poorest performing programs in the country to one of the best. This was accomplished during a period of staff cut-backs and rapid, increasing demand for the program's services. Although the IDHW made major process transformations, the effort to make this transition was not any greater than just doing their normal work. Instead, management and staff at IDHW just changed how they did their work.

We indicated earlier that the ultimate motivation for process changes and lean implementation is to increase customers' *perceived value* related to the goods and services. The Idaho Food Stamp Program improvements enhanced both the numerator and the denominator of the perceived value equation. The applicant customers benefited from receiving Food Stamps faster, the federal government customers benefited from more accurate application processing, and the Idaho taxpayers benefited from the productivity gains which compensated for the reduced budget.

Although there is no single approach to how lean should be implemented in a governmental organization, the lessons learned by the leaders and staff at the IDHW as they went through the process should prove valuable to other organizations. The most important of these lessons are:

- The new paradigm, or future state, must be clearly defined
- Leaders must be engaged and willing to take risks
- View the people who receive services as customers and look at everything from the customers' perspective
- We must stop doing those things that our customers don't value (except those things that are mandated by law or Federal rules. In that regard, we must constantly examine how we are interpreting these laws and rules to make sure we are applying them in the most customer friendly way possible.)
- Creating a lean culture requires extensive effort and can only be achieved when the leaders are trusted and the staff is included in the lean transformation.
- Improvement only comes from measurement and selecting the right metrics is critical to driving us in the

right direction.

- Lean will be most effective when it is approached from a system perspective and not as a series of independent improvement projects.
- Performance variation is a major negative and standardization of work functions is required to reduce this variation
- Sustaining the gains and maintaining the lean culture is challenging; we must understand that lean is not a program, but a journey that is never fully completed.

Idaho's success, and its potential for sustaining what has been achieved, is based on the IDHW's effort that has not been as much about the lean implementation process as it has been on developing a foundation that allows the transformation to take place. Idaho's Food Stamp Program has become a "process driven organization". Process is just as important, if not more important, than policy. This is critical because ongoing improvement occurs as processes are evaluated for effectiveness and subsequently improved. When "policy is king", or is revered as most important, a compliance driven mindset occurs and the organization becomes unable to see the customer, process, or administrative impacts.

Time will tell whether the Idaho Department of Health & Welfare will sustain these impressive results and continue to improve, and whether lean has truly been embedded into the culture. We do know that doing so will require ongoing, consistent leadership and a continued focus on looking at the Food Stamp Program through the eyes of the customer.

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A Systems View to IT Policy in Developing Countries: An Example from Venezuela

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Abstract: Developing countries are finding that maintaining adequate Information Technology (IT) policies is still a challenge if they aim to their socio-economic development. This paper will explore the argument that some developing countries could benefit from a systems' view approach to policy that enriches the process of a country's socio-economic development. It attempts to gain an understanding of the current and potential impact of national IT policies and strategies in Venezuela and highlights a number of preliminary suggestions to incorporate a systems view (Checkland, 1981) into the design of IT policies.

Key words: Venezuela; policy-making; information technology; developing countries; acquisition

JEL codes: O1, O2, O5, P2

1. Introduction

Information Technology using, if planned, developed and managed properly can bring about greater efficiency in organizational operations, better working environments and effective decision-making processes. Therefore, countries are being encouraged to attract economic growth by entering the "digital age" and being able to supply or compete at the global level. In this digital and information age tremendous advances have been made by large segments of the world population. Yet, there is a fear that technology is exacerbating inequality. This fear may not be universal, but it does play a role in developing countries in which information technology acquisition and diffusion policies have not yet been clearly established.

It is clearly seen in last year's Global Information Technology Report (2013) that many countries have already committed to advanced Information Technology for the improvement of their societies. However, distinctly diverging densities of uptake and incursion have emerged, generally determined by the affluence, capacities, value systems, and the competitive market dynamics of individual economies. These inequities in comparative adoption rates seem, however, to beg particular concern for developing countries with low rates of IT ingression. These countries may be missing out on the potential benefits of IT to assist their participation in the "digital age". Moreover, a closer analysis of this report showed that more than fifty percent of developing economies are struggling to develop the right strategies to partake in this innovative economies. Unfortunately, countries that are unable to enact adequate IT policies seem to be unable to take advantage of the new technologies. This may well be the case in Venezuela.

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Since the mid 1990s, Venezuela has embraced significant economic and political reforms. Restructuring initiatives in science and information technology have allowed authoritarian intervention from central government. These form part of the larger shift in the socio-economic paradigm that guides this South American nation. Political crisis, economic recession and the country's strong dependence on oil productions have had a debilitating effect on Venezuela's highly scientific-technical capacity. This paper explores to some degree, how these factors contributed to the country's current C&IT crisis. Venezuela is a relatively small country located in the northern part of South America and is the sixth largest oil-supplier in the world enjoying huge oil revenues. In Venezuela, emerging and advanced forms of digital infrastructure, such as the Internet and online information services, have been slow to be developed. One of the reasons for this is the lack of effective strategies. Current policies do not appear to support IT acquisition and/or development. In fact, the IT sector is often ignored as it is seen as an area requiring a high level of investment thereby leaving it in the hands of multinational investors who mostly have a different agenda in mind. Venezuela has gone through various political changes which have significantly jeopardized the country's own economy. According to Economist Intelligence since early 2001 Venezuela has been the third most difficult country in Latin America in which to start a technology business. This seems to have contributed to the deterioration of international investments and weakening of some national IT businesses. Consequently, the country is falling behind in the information age.

Building on our professional experiences and examples from the above, this research will focus on developing countries, Venezuela in particular, arguing that, when used effectively and supported by adequate and effective policies, information technology brings gains for the general populace. The first part of this paper attempts to explain, with real case scenarios, the importance of Information Technology in the development process. A brief discussion on the policymaking processes in the information technology for developing countries will follow. A soft system interpretative methodology is used in order to understand the complexities of a systemic approach to effective IT policies. Unfortunately, lack of space prohibits a detailed examination of our research findings. However, we will explore some of the IT issues found surrounding the country's IT operation. We will conclude with an open discussion for future research recognizing that a shift is needed towards a wider concept of policy design. The traditional design reflects a rather "prescriptive, linear" view, while we propose that a more dynamic approach which encompasses social, political, technical, ethical and other issues, is both necessary and desirable for Venezuela and other similar developing countries.

2. Literature Review: Why We Are Still Concerned with IT?

Around the turn of this century there were concerns about the possible impact of IT which led to a debate on the plight of the "digital divide". In this age of "information technology, international communication and global networking one cannot longer focus on the effects of this digital divide but rather on the importance of actively participate on the effects of IT and the development of an effective economic system that optimises and integrates a Nation into the global arena.

The importance of information technologies is a constant topic in the globalisation literature (see, for example, the World Economic Forum, 2013; Harrison, 2006; and Walsham, 2001). These technologies facilitate the globalisation trends and we could endlessly argue on its favour. Yet, the discussion of IT application in developing countries is complex, as there is diversity between the developed and developing countries; for example, the current status and potential for IT application in Australia will be totally different from that of

Venezuela. One must remember that any discussion of technology should consider local factors and related benefits. Some of the benefits for developing and complex environments, as highlighted in the IT literature are outlined below:

2.1 Poverty Alleviation and Economic Productivity

The World Development Report for 2013 (World Economic Forum 2013) addressed the most pressing issue now facing developing communities: the future of globalization and socio-economic development. Within this report, it was pointed out that IT can assist in the management of poverty alleviation, global integration and crises amongst international organizations. However, as Castells (1999) argues, in order to deliver these to developing countries we must ensure that those facilities are responsive to the most disadvantage and poorest communities. There are programs around the globe assisting the application of IT in remote areas aiming at “linking” isolated people, businesses and communities to the rest of the world; providing a new window of trade opportunities. For example, one success story is the program run by the Village Internet Programme of the Grameen Bank in Bangladesh. This program aims at promoting poverty alleviation by reducing migration from villages — a major problem faced in most developing countries — by creating information technology-related job opportunities for the rural poor, giving incentives to farmers’ agricultural work, and by educating the rural population in information technology (Grameen Communications, www.grameencommunications.org).

IT innovations and the capacity of a country in adopting these technologies creates an efficient engine of production that contributes to economic growth. Sachs (2000) argues that high-quality communications and information technology are essential for countries, and consequently communities, that aim to participate in the globalised world. IT is perceived as the key to improving economic performance and social well-being. For example, IT is seen to exert and influence the globalization of foreign trade and investment. If governments want to obtain the benefits from this, “the digital age”, they will need to put policies in place that can provide the adequate information infrastructure allowing communities to integrate their businesses into the world market. Those “policies” are the main concerned area of this paper.

2.2 Education and Health

Information becomes catalytic to the development of a country as a whole. Consequently, the processing and dissemination of information can be greatly facilitated by IT. The use of networks in recent years, for example, has facilitated “distant learning” programs in some developing countries. In supporting this argument, is the success of the Catholic University in Chile. In early 1992 the university with two other educational institutes commenced a five-year project to develop and evaluate an elementary school network. Today, there are more than 152-networked schools, providing a variety of services to students and teachers (i.e., e-mail and access to databases, curriculum notes, educational softwares, etc). The network has been recognized by the World Bank as one of the projects which has had a significant effect on student creativity and educational development.

Walsham (2001) argues that national communication and international connectivity amongst developing countries themselves is still very sparse although one can imagine many useful health networking applications in developing countries where no paid doctors and other paramedics serve poor communities and rural areas. IT can have a potential impact in assisting the prevention of diseases by circulating crucial information that can help control the spread of deadly viruses. Montealegre (1998) argues that networking examples such as the HealthNet are more needed in developing countries. This program, as highlighted by Montealegre, “links health care workers in more than 16 African countries and four Asian countries with each other and with colleagues and databases in developing countries using a variety of communication protocols”. In 2013 this program has assist in the

prevention of health epidemic like Ebola. In programs like this, IT serves as a “life support system” for many Doctors, paramedics and patients often isolated by communication, geography and consequent lack of knowledge-information.

The global environment influences the policies of national governments and defines the opportunities and challenges facing policy makers and business leaders (Joham, 2002) For most developing countries multinational and national investors are the only hope for technological development as they are left to participate at the far end of the production line. Developing countries, if lucky enough, can be part of the IT consumer-line mass. But in Venezuela, for example, it is with the help of multinational investors that they can aim at positioning themselves in the supply chain. In order to take advantage of concurrent IT innovations and obtain some of the benefits indicated above, developing countries need to rely on an efficient and effective set of strategies that guarantees a solid foundation for those investors (Joham, 2002).

Corporate investment depends very much upon national regulations, so that building a solid foundation on IT policy and providing overall strategies are required for multinationals to be able to operate in a developing country's E-commerce environment. Most developing countries undergo major changes in order to attract globalisation. These changes often make it hard for Governments to focus on new and highly technical legislation thus causing delays in IT industry growth. Fluctuations of this nature (that is, unstable policies, political changes, unclear projects, etc) often discourages overseas IT investments. Furthermore, to rapid target these changes; Western IT models are adopted and as a result local technological and cultural constraints are ignored. Attention must be given to local social, political and technical issues when designing IT strategies to address globalisation.

3. The Method and Findings: A Systems View

Not all policies are born equal. Sometimes policies are not even planned at all to solve pre-existing problems but are formed randomly on new opportunities, for instance demanded by new technological innovations. Moreover, in developing countries particularly, sometimes policies are not agreed upon but even so occur. In determining how policies are moulded we must think beyond the policymaking processes itself. The complexities of a nation's economic and social structure, political structure, technology and wealth are examples of a variety of forces influencing a country's policy. This research on Venezuela's IT policymaking will not do justice to them all but aims to achieve a clear outline of the system itself.

In accordance with Mitroff and Linstone's (1993) multiple perspectives approach, the pattern of IT policymaking is seen to be influenced by a complex and dynamic interaction of factors — social, political, and technological — and not a single force or a static process such as the simple conversion of straight international models. As such, the need for a systems view and framework to incorporate the analysis and in-depth study of these factors arises. In this study a systems view is proposed which includes the interactions among the different factors of a country's policy network and stakeholder groups. In order to obtain a variety of perspectives and identify the issues surrounding a country's operation in the global arena, it was our intention to explore key stakeholders' concerns in Venezuela (i.e., government policymakers, private and public IT industries and market sectors, education and health sectors, etc).

From a pilot research conducted over one year in Venezuela, social, political and technical issues were studied in order to integrate the functions of these into a system for use when designing effective IT strategies to enhance participation in the global arena. The research project consisted of two major components. First, a

quantitative and qualitative study of the existing status of IT in Venezuela. IT statistics, strategies and regulations were measured in relation to the country's IT labour market, computer specialists, research and development, infrastructure, education, economy, etc. In this way, knowledge and identification of key stakeholders was facilitated. The research data was collected from Venezuela's IT strategies and regulations and mainly using extensive questionnaires filled in by local private and public development organizations, small and medium sized companies, the government, IT educational institutes and public in the IT field. Secondly, an in-depth research was executed over a period of sixteen months. In total, 65 interviews were completed, together with the recollection of video conferencing materials. This was done by assessing the IT needs of key stakeholders at the technical (T), organizational (O) and personal (P) level (Linstone, 1983). Finally, the in-depth studies underlined some of the issues, which needs to be considered when adopting the technology from abroad.

A summary of this complex environment, including key stakeholders and main issues affecting the country, are gathered on a "rich picture" (Checkland, 1981) as shown in Figure 1 and presented in narratives and arguments from a variety of sources.

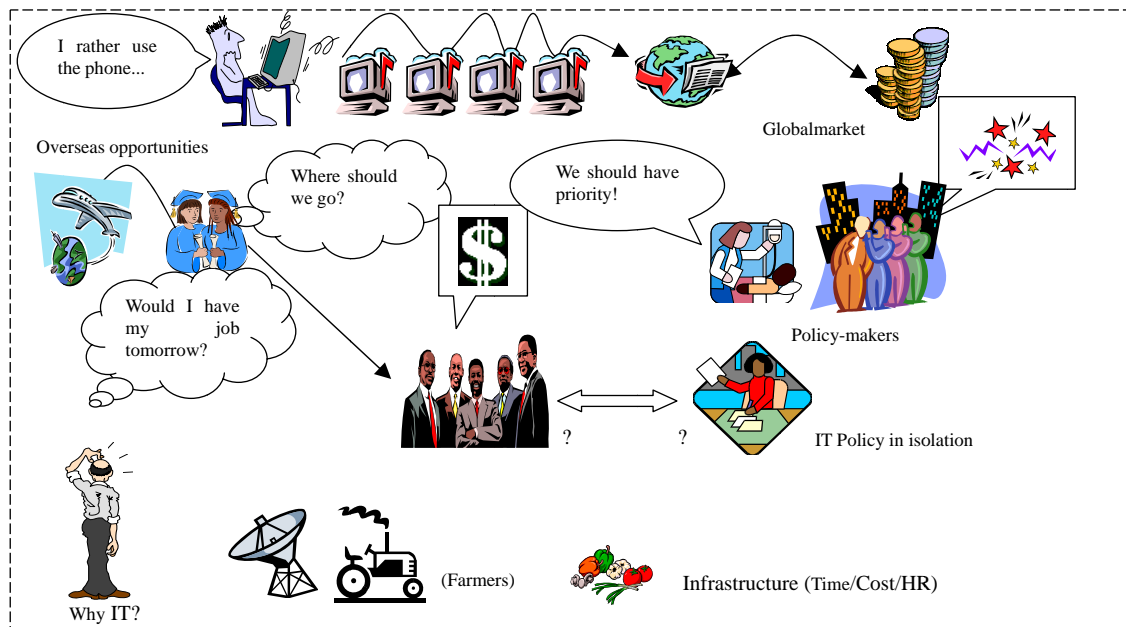


Figure 1 Venezuela Complex Environment

3.1 Personal Perspective: (P)

Narratives from two peoples' diaries are introduced in this section in the form of vignettes. Both diaries cover a period of two months. There are no particular patterns or regularity in the participants' writings; rather a reflective open form in which the authors felt at ease in their writings. Please note that these diaries were written voluntarily in Spanish and no formal translation or grammatical reconstruction of sentences into English has been done. In fact, the translation is literally how it reads in Spanish and as a result, some meanings might have been lost.

The first diary is from PZ, a sociologist who has worked in the private sector for ten years, in the public sector for eighteen years and has recently been involved in a program of people's alphabetization by means of computers. Pedro has also worked in research programs evaluating the psychological impact of new technology to disadvantaged communities. He has held a number of managerial positions and has directed well-known national

IT conferences. These are some of PZ's reflections:

"... after reading the Washington Post today I realized that the economic and social damage in Venezuela has reached the extreme that we do not have a leader, someone competent to lead and not to mandate. From one day to another we cannot raise a country, we cannot expect to solve the problems we have in the area of R&D, and IT. This is just not the priority in the country. The problem is that it will never be the country's priority. So, it is a no end tunnel, we will drive without knowing when to stop..."

"...when I go to the field and supervise our equipment I don't see computers, or technology or the tools that supposedly will help our people get out poverty. These people do not know how to read, they feel offended by the fact that we introduce them or push them to use computers. We need to understand our social structures before we anticipate the technology we need. The problem I fear is that under the strong class division now arising in the country this will most definitely be an impossible task..."

Dr MV has been working in the IT sector for almost twelve years and has worked in the education area prior to that. She has held a responsible position in the country's finance advisory cabinet. In recent years, she has also been approached as a policy advisor for the formulation of IT strategies addressing the acquisition and diffusion of technology within the country. This is one of Maria's main concern:

"...Venezuelans are faced with an impossible choice. They can support the current government or they can depose of it. The problem is that either way the country is already far behind in technological advancement, economic productivity and internationalization. The information age has already bypassed us and we are too use to being right at the end of the consumer chain that it will take long time, money and effort to make a change. Our policies are not helping the situation, the restrictions, the limitations in decision-making channels and lack of government support are only a few of the issues making this country fall backwards..."

The reflections from both participants, offer different viewpoints of Venezuela. Their perceptions are related to how the complexities in Venezuela may have affected them personally and professionally, but also how they seem to be affecting IT development.

3.2 An Organization Perspective (O)

Two main organizations deal with IT issues in Venezuela: the government, the Catholic Church and the general industry-business sector. Each sector appears to have a different view about what these issues are. However, from an organizational point of view, they have all agreed that IT is an area in urgent need of funds and adequate attention.

Government: Predominantly, past and current government bodies have focused on the technical aspects of IT issues. In recent years, most programs and policies have been established for technology acquisition, use and distribution. Between 2005 and 2012, a total of 10 decrees and 15 policies have been formulated under the Ministry of Science and Technology acknowledging the need for state of the art technology in Venezuela and proposing adequate programs to guarantee the accessibility of this technology to all social-sectors.

Another example is the formulation of the decree 825 in 2000 (still in progress today) in relation to the use of internet. In this decree, the use of internet is established for the entire education sector of Venezuela. A priority for hardware and software distribution to institutions in various regions is listed but nowhere is the preparation for training specified. A close review of Venezuela's national science, technology and innovation development plan (2012) also provides evidence that the government's main focus is a technological one. The following were some of the proposed policy formulation issues for the years 2001-2007 (MCT, November 2007). Government policy advisors and members of the Ministry of Science and Technology by direct members of MCT (i.e., Ministry of Communication and Technology) were responsible for the following:

- Modernize TIC (Information, communication and technology) in private and public organizations
- Red (network) Reacciu

- RIVED (International Virtual Red in Education)
- Red “Oil-production”
- Formation of Specialists in Red Cisco Networking Academy
- CATC (Cisco Academy Hardware-Training)
- Intranet del CNTI
- Cluster in TI
- International TI participation (government bodies)

Business sector: As in other developed countries, in Venezuela there is a general perception that communication and information technology can improve the economy and performance of the business sector. Hence, the perception of C&IT is one of development. Unfortunately, as pointed out in one of the local main newspapers El Universal, for most businesses there is a general struggle to keep up with technology and the constant demands imposed by the new government IT taxes and regulations. The perception in the business world seems to be that technology has not been given adequate funds, planning or attention. Consequently, most organizations continue to use obsolete equipment while trying to avoid losing their businesses to international competitors.

3.3 A Technical Perspective (T)

Various international and national media sources, newspapers, independent web reporters, science magazines and journals have described the current political crisis in Venezuela as one that threatens to jeopardise and even destroy the country’s scientific and technical infrastructure. The changes taking place in the country have not only had an impact in the political and economic arena, they have also affected the future of science and technology. From a technical perspective, these changes appear to have influenced how technology within the country is used (i.e., as a main platform for communication); how technology is diffused (i.e., education programs) and who can acquire it (i.e., hierarchical distribution and accessibility of state of the art technology). To aggravate matters, for the last three years, the approved budget for the Ministry of Science and Technology has not been delivered as agreed. According to the Association for the Advancement of Science in Venezuela (i.e., AsoVAC), since 2002 only one third of the promised budget has been delivered and most of the spending has been directed towards maintaining bureaucracy. New laws regulating science and technology, which allow for authoritarian interference from the government have deteriorated the technology available to universities, the modest but high quality research activities existing in the field, and the professionals’ IT development in the area.

Many Venezuelan students and professionals are exposed to United States’ technology. According to the National Trade Report (2000, p. 20), since early 2000 out of approximately half a million IT university graduates, 20% are educated totally or partly in the United States, and another 20% has had direct exposure to United States culture and working practices. This exposure to the US has been the basis of technical training for many IT professionals and has created over the years a demand for American IT products. The problem professionals now face is that, due to Venezuela’s current crisis, they no longer have easy access to or training in overseas technology. In addition, because Venezuela does not produce any hardware inside its own borders, IT development is on hold and training is limited to obsolete hardware. Contrary to this situation in the hardware industry, the software industry in Venezuela is efficient. However, it is starting to be limited to the capacity of the hardware available.

The technical issues associated with Venezuela’s current political and economic crisis are more significant than they may at first appear. Venezuela’s strong reliance on overseas markets for technology equipment alone for example, has several implications in exports and manufacturing systems, high emigration of skilful labour, slow

IT growth, ineffective training and professional development, cultural changes etc. As mentioned earlier, it is important to view the impacts of Venezuelan complexities from different perspectives, and a technology viewpoint can expand the boundaries for analysis and awareness.

4. Implications and Conclusions

The multiple perspectives approached adopted in this research has not been directly intended to integrate all the perspectives studied (i.e., T,O, P), but to explore them within the fieldwork reflecting on the fact that *systemically the whole is more than the sum of its parts* and that each way of viewing involves distinct paradigms, not merely different scientific models (Mitroff & Linstone, 1993). Policies are built on theories of the world, and are often passed on without considering the variety of forces influencing the recipient nation. The problem increases when policymakers make *rationality* the basis of policy and ignore the complexities of the environment. For example, some of the characteristics that communication and information technology policy posses clearly illustrate that policymaking is a conflictive process that cannot ignore the local factors affecting a country's national IT development. Policies are:

- about *making decisions* and testing their consequences at all levels, that is to say their impact at the technical, organizational and personal. Policies that are reached through a decision making framework express a considered response to a policy issue and are usually authoritative framework of the government's approach to technological development.
- are strategically structured, with identifiable stakeholders and recognizable consequence of actions.
- Are base on an interactive learning process of continues evaluation and improvement *and*
- are political in nature, expressing the priorities on the government's IT agenda.

The complexities of the environment in which policy takes place has a great impact on the policy itself. A range of influences such as IT governance, business, consumer and local interest groups interact dynamically with policymaking processes. Policy is frequently based on experimentation and simply the result of the course of events. Therefore, there is no single best procedure for managing information technology policies since it depends on external factors such as social, technical, political and cultural issues that vary from one country to another. Future research is required in order to find ways to manage effective Venezuelan public policy goals in the competitive marketplace of the global economy. However, a multiple perspective framework combined with a systems view could be beneficial in the process of policy making. The researchers will further explore how this may be achieved in the future.

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Analysis of Energy Integration and the Transboundary Superstructure in South America

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Abstract: The purpose of this work is to present the difficulties of the superstructure when related to EI (Energy Integration) process in South America. The methodology aims to give emphasis to related projects within a binational and multinational scope. Methodologically there is the consideration of deterministic indicators, such as: project costs, installed capacities, financing sectors and politics strategy. These results in quantitative evidences that less developed countries from Latin America (LA) are precisely the ones that consume less electric power per capita and that have large reserves of energy resources, available to be commercialized with countries that have high demands and lack of reserves. Results also demonstrate that EI carries factors of development (national and regional) that ensure supply, reliability and efficiency in this region, which minimizes the dependency for only one energy source and reduces store costs. A conclusive element refers to relevant economic gains for countries that commercialize their energy resources or electricity surplus, which includes the possibility of development of other structural areas. Once established the region's physical integration, the enhancement of trade, political, social and cultural relations between their members are greatly expanded.

Key words: energy integration; transboundary projects; energy planning; South America; integrated resource planning; supranational bodies

JEL codes: F020, O210

1. Introduction

South America (SA), see Figure 1, is a subcontinent that comprehends the southern portion of America. Its surface corresponds to 17.819.100 km², representing 13.7% of Earth's surface. Its natural boundaries are the Caribbean Sea to the north; Atlantic Ocean to the east; northeast, southeast and Pacific Ocean to the west. It concentrates a population of approximately 407 million inhabitants, 6% of world population, which 84% lives in urban areas and 16% in rural areas. It has a population density of 22.8 inhabitants per km², Gross Domestic Product (GDP) of 4.368 billion (currently US\$), about 6% of world GDP (WDI, 2014) and Human Development Index (HDI) of 0.740, see Table 1, which, according to UN, is a high human development index (HDR, 2014).

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Figure 1 South American Projection

SA has abundant natural resources but still presents serious socioeconomic problems. Since the beginning of its colonization, the continent has served as raw material supplier, at first for its metropolis and currently for developed countries and China, staying at the sideline of technological and social development.

The economy is concentrated in beneficiation of agricultural products, in production of consumer goods, mining, steel mill, extraction and petroleum refining.

Regarding the energy sector, SA has big petroleum reserves, with 322.4 billion of bbl, highlighting Venezuela with 92% from the total, and natural gas reserves, with 7,097 Gm³, highlighting Venezuela and Bolivia (Olade, 2011). Besides that, SA has the biggest water system in the world, in which the mainly basins are the Amazon, Orinoco and Plata systems. These three systems, together, drain an area of 9,583 MM km² (54% of SA territory), and big lakes like Titicaca and Poopó, Andes region, and Maracaibo lake, in Venezuela. This characteristic ensures this region a great hydroelectric potential (583 GW), which only 25% (144 GW) of the total is used nowadays (IEA, 2012), see Figures 2-4.

Table 1 Countries and Dependencies in South America

| Country | Area km ² | Population (2013) | GDP (x10 ³ current US\$ 2013) | HDI (2013) |
|----------------------------|----------------------|-------------------|--|------------|
| Argentina | 2,791.810 | 41,446.246 | 611.755 | 0.808 |
| Bolivia | 1,098.581 | 10,671.200 | 30.601 | 0.667 |
| Brazil | 8,514.877 | 200,361.925 | 2,245.673 | 0.744 |
| Chile | 756.950 | 17,619.708 | 277.199 | 0.822 |
| Colombia | 1,141.748 | 48,321.405 | 378.148 | 0.711 |
| Equator | 256.370 | 15,737.878 | 90.023 | 0.711 |
| Guyana | 214.970 | 799.613 | 3.076 | 0.638 |
| French Guyana ¹ | 86.504 | 209.000 | - | - |
| Paraguay | 406.750 | 6,802.295 | 29.949 | 0.676 |
| Peru | 1,285.220 | 30,375.603 | 202.296 | 0.737 |
| Suriname | 163.270 | 539.276 | 5.231 | 0.705 |
| Uruguay | 176.220 | 3,407.062 | 55.708 | 0.790 |
| Venezuela | 916.445 | 30,405.207 | 438.284 | 0.764 |
| AS | 17,809.715 | 406,696.418 | 4,367.942 | 0.740 |
| World | 129,733.917 | 7,124,543.962 | 74,909.811 | 0.702 |
| SA/W Rel | 13.7% | 5.7% | 5.8% | - |

Note: ¹Territory entirely integrated to France

Source: own elaboration, data from WDI, 2014, HDR, 2014.

In the current context of increased demand for mineral and energy resources in Brazil and SA, caused by economic growth and expanded access to electricity by poorest and geographically isolated populations, which, economically, expand the need for energy and raw material for companies to extract and process their products and, socially, improve people's lives by adding lighting, heat and transportation. So, it is inherent the need of energetically integrating the region, since lots of these resources are exhaustible and not distributed in a homogeneous way in that space. Energy planning becomes important in a way to guarantee security and energy efficiency, in a long term, in the whole area.

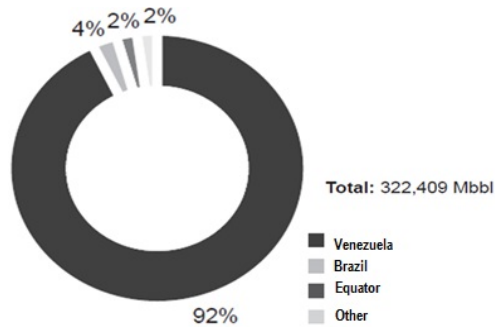


Figure 2 Distribution of SA Petroleum Reserves (Olade, 2011)

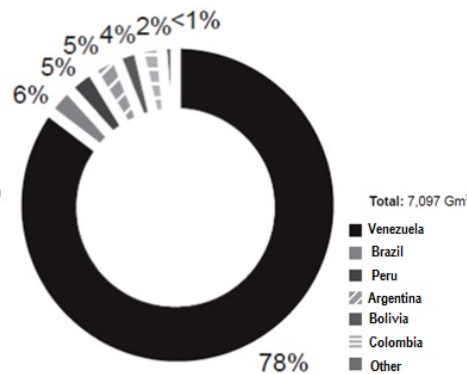


Figure 3 Distribution of SA Natural Gas Reserves (Olade, 2011)

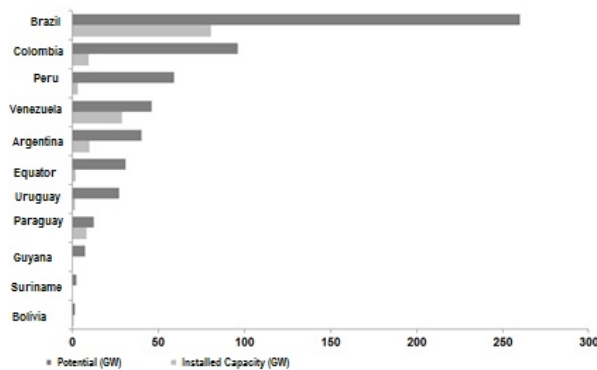


Figure 4 South American Hydroelectric Potential (Olade, 2011)

In EI it is necessary to discuss and understand specific and regional needs of the nations, as well as diplomatic history between them, because the current political conjuncture of SA overlaps its economics facilities, since energy is one of the foundations of economic integration in the globalized world. Therefore, EI aims to determine what the

energy sector, characteristic of each country, can offer to the process of social and economic development in national policies and regional integration scope.

Within Latin America (LA) context, the dynamics of SA integration will be presented with more emphasis since it is the study focus and many times these relations will occur with Central America and North America countries, because they have historical, political, economic and social similarities.

2. Methodology

This work consists in the analysis of SA integration, through bibliographic and historic survey of bilateral and regional agreements, identifying:

- Main involved agents (public and private);
- Supranational Organisms;
- Existing, implanted and planned integrations.

From this survey, analyze EI studies and projects in South America, considering the kind of project, involved countries, funding source, investment amount and implantation area, and, thus, identify the future perspective of SA integration.

The projects selection goes after the following criteria:

- (1) Projects linked to IIRSA (Initiative for the Integration of the Regional Infrastructure of South America);
- (2) Having the purpose of EI;
- (3) Binational or Multinational;
- (4) Having physical infrastructure of electricity generation or transmission;
- (5) Being concluded or in an execution phase.

3. Supranational actors involved in South America Integration

Throughout history several regional organisms in SA were suggested, at first for defense and arbitration cooperation of external policies, like the ABC pact 1915, formed by Argentina, Brazil and Chile, with the aim of minimizing United States' influence at the region and establishing consultation mechanisms. Posteriorly, these agreements had the feature of promoting trades and regional production and, after that, of South America integration.

In Latin America, nowadays, there are several supranational organisms linked to regional integration, like Andean Community of Nations (CAN) and Southern Common Market (Mercosur), which are small regional blocs formed, mainly, by Andean countries and Southern countries, respectively. There are even bigger blocs, like Union of South American Nations (UNASUR) and Latin American Integration Association (ALADI), the biggest bloc in LA, formed by thirteen countries. In truth, all blocs aim internal and regional development of their societies.

Regarding EI process, as well as the regional integration, there are several supranational organisms, like ARPEL, ECLAC (United Nations Economic Commission for Latin America and the Caribbean), CIER (in Spanish *Comisión de Integración Energética Regional*), OLADE (Latin American Energy Organization) and IIRSA. These organisms have the role of contributing to the integration process as a whole, since they can represent a support in regional countries decision making through studies, debates promotion, standards setting, regulatory framework and information handling, thus ensuring energy markets integration with the purpose of achieving efficiency in resources utilization, infrastructure functioning of transportation network, regulatory and contractual framework.

Establishment and good functioning of these three assumptions are extremely important, since petroleum and natural gas reserves, as well as watersheds are not distributed uniformly, hydrological regimes between the north and south of the continent are complementary. Therefore, common regulatory framework establishments between all the areas guarantee a good functioning of all energy chain, enhancing resources and energy flow and favoring all integration chain.

EI in LA occurs through uni-bilateral investments between countries of the region, like the cases of binational hydroelectric power plants case, gas pipeline construction connecting two or more countries case or simply energy exportation from one country to another, because it is usual an area of the country having a specific energy resource, but not funds to develop an energy generation and/or transmission project. On the other hand, there are countries that need energy and have capital to invest, but that have no energy reserves to explore, so they need the surplus of their neighbors. Because of this complexity, several agents, in all dimensions, are involved in negotiations, like political (national and supranational states) agents, economical (banks and development agencies) agents, companies (public, private, national and multinational) and civil society.

3.1 Latin American Regional Blocs

(a) Andean Community of Nations (CAN)

CAN is a South American economic bloc formed by Bolivia, Colombia, Equator and Peru. Chile left the bloc in 1977 due to political issues linked to Augusto Pinochet dictatorial period and Venezuela left it in 2006 due to an agreement firm by the bloc and the USA without the presence of Bolivia and Venezuela, which changed the 266 *article* about the free trade in medicines. One month after Venezuela had left the bloc, Chile was reincorporated as an associate member.

The area has big reserves of hydrocarbon, petroleum and natural gas, besides a huge and underexplored hydroelectric potential. Countries like Venezuela, Equator and Colombia, being the first two members of OPEC (Organization of the Petroleum Exporting Countries), have big petroleum reserves. Regarding natural gas, there is Bolivia and, once again, Venezuela with big reserves. This factor permits these countries to be big hydrocarbon suppliers in the area, since their productions surpass the domestic consumption and let the excess of their reserves to be exported. Argentina, Brazil, Chile and Peru are big regional importers of these hydrocarbons, highlighting Chile, for it demands lots of energy quantity and has small reserves. Such dependence makes Chile search for a bigger stimulation of regional interconnections, focusing on them with Colombia to access lines from Central America region (ME, 2012).

Regarding the electrical interconnections, CAN has the biggest advancement between SA blocs, which, through the Decision n°536, adopts the general framework for sub regional interconnection of electrical systems and intercommunity exchange of electricity, ensuring legal and regulatory conditions of electricity commercial transactions between member countries and leading harmonization and utilization of energy resources of the region (OLADE, 2010). Despite the big advance in regional context of SA, the bloc was suspended due to internal political factors of CAN members.

(b) Southern Common Market (Mercosur)

Mercosur, see Figure 5, is a customs union, i.e., a free trade zone formed by five countries of SA, Argentina, Brazil, Uruguay and Paraguay. The last one returned to the bloc after April 2013 elections, after its suspension due to the coup d'état that toppled the president Fernando Lugo in June 2012. Venezuela was the last country to join the bloc, in July 2012, which occurred right after Paraguay been suspended, for this country had vetoed Venezuela's admission. Bolivia is in accession process as a full state and integrated to the bloc.

Beside those five countries, the bloc has associated members like Chile, Colombia, Ecuador, Guiana, Peru and Suriname. Chile is currently in a process to become a full member, but before it the country is in diplomatical discussions on territorial problems with Argentina.

Mercosur is seen as a weapon against the American influence, because it has a large sales and diplomatic force in the region. It is easy to see its extension when analyzing numbers: in 2011, Brazil had exported US\$ 256.04 billion, of which US\$ 27.9 billion (with a balance of US\$8.5 billion) were exported only to Mercosur (MDIC, 2012).

Besides free trade agreements between members and associated countries, Mercosur has agreements with Israel and Egypt.

The big market asymmetry has been causing misunderstandings inside the bloc. The Brazilian GDP representing 63% of bloc's GDP, this hampers commercial relationships and the creation of a single currency for the bloc, among other issues. Several misunderstandings have been happening along the bloc's history, for example, Paraguay and Uruguay claiming economic concessions since commercial exchange in the bloc were twenty times lower than the one conducted by Argentina.

Brazil is the leading economy of the bloc, which has been causing some friction and diplomatic struggle between its members, for every year this country has a surplus trade when comparing to the other member countries.

Brazil-Uruguay: In 2007, Brazil had exported to Uruguay US\$ 1.5 billion; products were diesel oil, cars, auto parts and cellphones. On the other hand, Uruguay had exported US\$ 818 million and the products were agricultural commodities and plastic bottles.

Brazil-Argentina: In 2007, Brazil had exported US\$ 14.7 billion to Argentina; products were white line, cars, auto parts and cellphones. On the other hand, Argentina had exported US\$ 9.55 billion and the products were agricultural commodities (mainly wheat) and naphtha.



Figure 5 Mercosur Countries (Mercosul, 2014)

Brazil-Venezuela: In 2007, exports reached US\$ 4.96 billion and Brazil had the surplus of US\$ 3 billion. Brazilian exports to Venezuela are basically manufactured products, chicken meat and sugar. Products that lead the Brazilian importation are 28% jet fuel, 23% petrochemical naphthas and 11% diesel oil.

Brazil-Paraguay: the commercial unbalance between these two countries are even bigger, with exports reaching US\$ 1.92 billion and Brazil with a surplus higher than US\$ 1 billion. Brazilian exports are based on diesel oil, fertilizers, tires and charge cars. Paraguay exports agricultural commodities as wheat, corn, cotton and soy. In this context, Itaipu's energy is not recorded, since the energy purchase is not linked to Mercosur agreements (Mdic, 2012).

Bloc's EI started with resolution N32/98, which stimulates the parts to extend the electricity exchange in order to complement their energy resources, optimize the supply security, reallocate energy surplus and rationalize the installed capacity of its members. This resolution did not make any progress, for it was beneath the ANC integration, normative number 536.

(c) Union of South American Nations (UNASUR)

UNASUR is the intergovernmental union between Mercosur and CAN. This union is part of the South American process integration and is formed by all independent countries of South America plus Mexico and Panama as observer countries, see Figure 6.

The integration of these two blocs was signed in 2008 with UNASUR Constitutive Treaty. The bloc intends to structure the community in a European Union way, i.e., adopt unique passports, parliament and currency.

The integration mark is based (Unasul, 2010) on common market and elimination of rates for products considered non-sensitive until 2014 and for sensitive products until 2019, in infrastructure cooperation through IIRSA (Initiative for the Integration of the Regional Infrastructure of South America), a program that aims to promote the South American integration through physical integration with the modernization of transportation, energy and telecommunication infrastructure with estimated investments of US\$ 38 billion. Financing agents of this program are Inter-American Development Bank (IDB), Development Bank of Latin America (CAF), The Brazilian Development Bank (BNDES) and Financing Fund for the Development of the Rio de la Plata Basin (FONPLATA).

Bloc's monetary policy is ruled by South Bank, created by the bloc itself, and one of its goals is to establish a single currency. Defense policy includes the creation of a military integration between members of the bloc as a way of protecting the area, as well as creating an arms industry exchange of these countries. The bloc is committed to democracy through defense mechanisms of member countries against coups to the civil power legitimately constituted. In occurrence of such violations, the bloc provides political and diplomatic sanctions as suspension of the right to participate in UNASUR and partial or total closure of land borders of the state that caused the conflict.

The bloc provides free circulation of people, ensuring freedom to member countries citizens to stay until 90 days with the presentation of nothing but the identity card.

Obstacles in the bloc consolidation are due to individuality and rivalry between some countries. Argentina suffers from the loss of regional power to Brazil due to aggravation of its economic crisis. Brazil, on the other hand, has increased its partnerships with neighbor countries due to commercial dynamics practiced in recent years by current government that aim to reduce economic dependence of the USA, searching for new partners and signing new agreements with old partners. Chile has some political differences with Argentina, Bolivia and Peru due to past wars that resulted in a loss of territory for Argentina, take of Bolivia and Peru territories and, more recently, due to gas crisis between Argentina and Chile - thanks to cancellation of natural gas supply by Argentina that needed it for intern consumption. Besides that, there is a big political problem between Colombia and Venezuela due to Colombia's military alliance with USA ("Colombia Plan") to fight drug traffic and to disrupt the country guerrilla. In the last years, this caused some diplomatic dispute due to Colombian troops invasion of Venezuelan territory to fight the Revolutionary Armed Forces of Colombia (FARC).



Figure 6 UNASUR Member States (UNASUL, 2012)

(d) Latin American Integration Association (LAIA)

LAIA, the biggest Latin American bloc, is an intergovernmental organism with head office in Montevideo, Uruguay, that aims the promotion of Latin American region integration and the guarantee of the social and economic development of its members (ALADI, 2012).

Initially, LAIA was called LAAFT, Latin American Association of Free Trade, which was an unsuccessful attempt of Latin American integration in the 60's.

The first members were Argentina, Brazil, Chile, Mexico, Paraguay, Peru and Uruguay. Already in the 70's, LAAFT expanded with new members adhesion: Bolivia, Colombia, Equator and Venezuela. In 1980, LAAFT became LAIA; in 1999, Cuba affiliated and, in 2012, Panama affiliated, totalizing thirteen member countries, see Figure 7.

Inside the vision of integration process, the bloc provides gradual elimination of obstacles to reciprocal trade from member countries, impulsion of solidarity bonds and cooperation between Latin American people, promotion of economic and social development of the region in a harmonious and balanced way to ensure a better life level for its people, renovation of Latin American integration process and establishment of mechanisms applicable to regional reality, creation of an area of economic preferences that has as an ultimate goal the establishment of Latin America common market through three mechanisms: regional tariff preferences applied to products originated in the member countries against tariffs in force for third countries, agreements of regional range common to all member countries and agreements of partial range with the participation of two or more countries from the region.



Figure 7 LAIA Member Countries

Bloc's agreements cover various economic, social and environmental niches, such as: trade promotion, economic complementation, agricultural trade, financial, tax, customs and health cooperation, environment preservation, scientific and technological cooperation, tourism promotion and technical standards.

3.2 Economic Agents Linked to Latin American Integration

Economic actors in LA and SA act like economic enablers of infrastructure implantation of region integration, since these works are expensive, making projects not viable for economically smaller countries in the region. Main economic agents that operate in the area are public entities of its countries or blocs, as BNDES, FONPLATA and CAF, or international agents as IDB and World Bank (WB).

(a) Banco del Sur

It's a monetary fund linked to UNASUR and developed to lend money to social and infrastructure programs of nations from South America. This bank is an alternative to IMF, WB and IDB, because they have a bad image among the region countries. They performed loans to these countries and contracted debts to develop projects linked exclusively to multinational companies.

This bank creation intends to cultivate a bigger integration between UNASUR countries, helping companies and member states to borrow money to develop projects without having to be victims of perverse conditions of international banks. Besides that, of course, the intention is also to become the central bank in case UNASUR integration comes true.

(b) Development Bank of Latin America (CAF)

CAF is a financial organism that encourages and foments the Andean region integration. It is an Andean foment bank founded in 1968 after Constitutive Agreement signature, giving the entity the role of a multilateral bank that promotes development and Andean integration, but only in 1970 its operations were formally started.

Nowadays, CAF is formed by 18 countries from Latin America, Caribbean and Europe, see Table 2, in addition to 14 private banks from Andean region. Its investments are based by credit operations, aids and support in financial and technical structure of projects from LA public and private sector with investments in infrastructure area, social development, environment, public policy, research, financial and corporate sector.

Table 2 CAF Member Countries (CAF, 2012)

| Country | Member / Stocks |
|---------------------|------------------------------------|
| Argentina | 2011 / 6.9% (U\$ 643 MM) |
| Bolivia | Founder 1970 / 6.1% (U\$ 511 MM) |
| Brazil | 2006 / 6.3% (U\$ 907 MM) |
| Chile | 2009 / 0.9% |
| Colombia | Founder 1970 / 6.2% (U\$ 2.05 bi) |
| Costa Rica | 2002 / 0.5% |
| Equator | Founder 1970 / 6.2% (U\$ 873 MM) |
| Spain | 2002 / 2.5% |
| Jamaica | 1999 / 0.03% |
| Mexico | 1990 / 0.8% |
| Panama | 1997 / 1.2% (U\$ 198 MM) |
| Paraguay | 1997 / 0.5% (U\$ 199 MM) |
| Peru | Founder 1970 / 21.6% (U\$ 2,29 bi) |
| Portugal | 2009 |
| Dominican Republic | 2007 / 0.9% |
| Trinidad and Tobago | 1994 / 0.1% |
| Uruguay | 2001 / 2.1% (U\$ 241.2 MM) |
| Venezuela | Founder 1970 / 21.6% (U\$ 627 MM) |

(c) Financing Fund for the Development of the Rio de la Plata Basin (FONPLATA)

FONPLATA was founded in 1974 by its current members, Argentina, Bolivia, Brazil, Paraguay and Uruguay, that joined by the need to increase efforts and reach development and integration among them. FONPLATA defrays studies, projects and programs executions that develop physical integration of *Rio de la Plata Basin* and its influence area. This way, the fund acts in different programs in the region, as intergovernmental committee Paraguay-Parana waterway and IIRSA. The capital structure of member countries is presented in Table 3.

Fund investments stand out with infrastructure works of social welfare, as programs against floods, warning and disaster preparedness, urban infrastructure, public housing, besides road, shipping and rain transport infrastructure and studies about Guarani aquifer and Paraguay-Parana waterway.

Table 3 FONPLATA Capital Structure in US\$ (FONPLATA, 2010)

| Countries | Integrated capital | Executable capital | Capital total | Participation % |
|-----------|--------------------|--------------------|---------------|-----------------|
| Argentina | 149,743.812 | 13,334.000 | 163,077.812 | 33 |
| Bolivia | 49,904.126 | 4,444.000 | 54,348.126 | 11 |
| Brazil | 149,743.812 | 13,334.000 | 163,077.812 | 33 |
| Paraguay | 49,904.126 | 4,444.000 | 54,348.126 | 11 |
| Uruguay | 49,904.126 | 4,444.000 | 54,348.126 | 11 |
| Total | 449,200.000 | 40,000.000 | 489,200.000 | 1000 |

(d) The Brazilian Development Bank (BNDES)

BNDES is a Brazilian federal public company. Currently is the main instrument of long-term financing for investments realization in all economic segments, covering a policy of social, regional and environmental dimensions (BNDES, 2012).

Founded in 1952 to support agriculture, industry, infrastructure, commerce and services, nowadays it offers conditions to micro, small and medium companies, besides owning lines of social investments directed to education,

health, family agriculture, sanitation and urban transportation.

Financing is based on projects investments, purchasing of equipment and exports of goods and services. In addition, the bank has a modality called non-reimbursable funding, that consists on making financial investments without requiring refund, it is about social, cultural (teaching and research), environmental, scientific and technological investments. The bank acts like a Brazilian company's provider in projects inside Brazil or abroad, as long as it is destined for Brazilian companies.

BNDES disbursed R\$ 94.6 billion between January and September of 2012, an increase of 3% regarding the same period in 2011. Industry and infrastructure were responsible, together, for 68% of total, highlighting paper and cellulose, chemical, petrochemical, mechanics and transport material (BNDES, 2012).

Therefore, BNDES invests in organizations and individuals enterprises following criteria that prioritize development with social inclusion, job and income creation and generating foreign exchange.

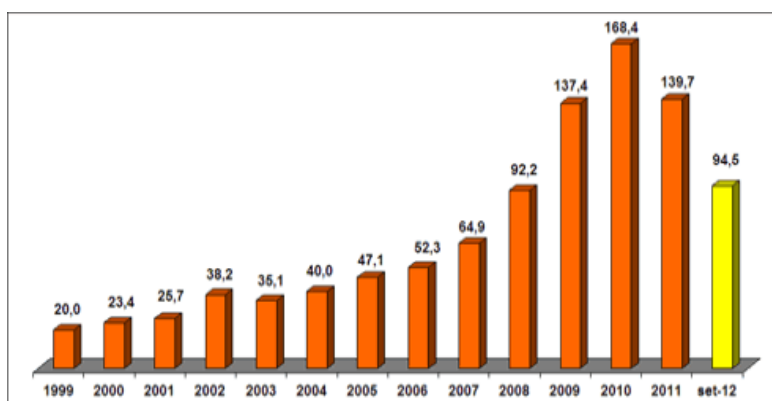


Figure 8 Evolution of BNDES Disbursement in R\$ Billion (BNDES, 2012)

(e) Inter-American Development Bank (IDB)

IDB is a bank created in 1959 to finance development projects of Latin America and Caribbean countries. The bank's shareholder picture is formed by 48 countries, in which 26 are from Latin America and Caribbean and have majority share.

Besides making loans, IDB provides donations, technical assistance and researches in the area. Due to its shareholder base, IDB is able to borrow from international markets with competitive rates and transfer this benefit to 26 Latin American and Caribbean countries (IDB, 2012).

Besides that, IDB has a fund to special operations (FSO), which provides subsidized financing for more vulnerable member countries as: Bolivia, Guyana, Honduras and Nicaragua. Haiti receives donations from IDB Donations Fund. Due to democratic criteria, Guatemala and Paraguay receive a smaller part from FSO financing, because of the coup d'etat that these countries suffered. Traditionally, IDB finances projects in LA region, and since its foundation it invested more than US\$ 40 billion (McElhinny, 2008), but this participation has decreased due to appearance of other financing agents in the region, as CAF and FONPLATA, and of national banks as BNDES. This reduction reflects economic growth and fortification of countries from this area.

3.3 Actors Involved in Latin America Energy Integration

Just as political and economic actors, LA and SA have organisms directly linked to energy market. These organisms aim to provide favorable market and regulation conditions to energy companies that desire to invest in the region, in addition to conducting studies and to assist EI's infrastructure implementation.

(a) Regional Association of Oil, Gas and Biofuels Sector Companies in Latin America and Caribbean (ARPEL)

ARPEL was created in 1965 and is formed by 35 companies and institutions from hydrocarbons sector that operate in LA, holding more than 90% of region sector. It is an interactive forum for ideas, experiences and knowledge exchange in order to identify issues that may affect the development of hydrocarbon industry, i.e., it is an association developed to perform lobby with region governments.

ARPEL includes EI, environment, security and regulation as themes, elaborating proposals of its demands for governments' formal analysis. In 2003, ARPEL promoted a symposium that highlighted the importance of Regional Organisms coordination and boosted the creation of EI Regional Forum. The second symposium was held in 2004 and it consolidated EI Permanent Regional Forum, with the participation of all organisms linked to EI of this region (ARPEL, LAIA, OLADE, CIER, ECLAC), highlighting that none of these actors could be protagonist and their contributions should be considered keys. However, the leadership of the integration process should be of governments.

(b) United Nations Economic Commission for Latin America and the Caribbean (ECLAC)

ECLAC was created in 1948 by United Nations Economic and Social Council and it is one of five UN commissions with head office in Santiago do Chile. This commission cooperates to collaborate and coordinate along with other organisms, regional and sub regional, working in the energy sector of LA and offering advice to governments in regulation (water and energy), electricity laws, hydrocarbons, natural gas, rational use of energy and new and renewable sources. Posteriorly, its work expanded to Caribbean countries and it incorporated the goal of promoting social and sustainable development. Currently, this commission monitors policies aimed at promoting economic development of LA, advises actions directed to its promotion and contributes to strengthen and support area countries relations and economic growth, between each other and with other world nations, considering the social policy rule, treatment of environmental and demographic aspects, educational strategy, need of technical progress to insert itself in a competitive way in the global context. It consolidates the stability of the region economies (CEPAL, 2012).

(c) Latin American Energy Organization (OLADE)

OLADE was created in 1973, in the context of the international energy crisis of the 70's, due to the big increase in the oil barrel prices, strongly affecting LA and Caribbean countries, that lack energy policies; given the need to face this crisis, OLADE initiated a political mobilization in this region, with the creation of that organization.

OLADE is formed by 27 member countries, twelve from South America (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, and Venezuela), six from Caribbean (Barbados, Cuba, Granada, Haiti, Jamaica, Trinidad and Tobago, and Dominican Republic), seven from Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama), one from North America (Mexico), and one participant country (Algeria). Algeria is a participant country because it is not on the Latin America and Caribbean region, having access to the products and services provided by the organization, and being allowed to show its voice, but not voting (OLADE, 2012), see Figure 8.

OLADE is a political and technically supportive organization, in which its member States take common efforts to the EI of the region, always seeking sustainable development with advice and cooperation of all the members.



Figure 9 (a) Member countries and (b) participant country in the OLADE

(d) Comisión de Integración Energética Regional (CIER)

CIER was created in 1965 with the support of South American companies from the power sector. Currently, it is a non-governmental organization that includes power companies and non-profit organizations united with the bodies of the electricity sector of the member States. That commission is formed by 10 members (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela) and by the CECACIER (Regional CIERs Committee to Central America and Caribbean) formed by Costa Rica, El Salvador, Guatemala, Dominican Republic and Panama, totaling 263 companies related to the power sector. Moreover, it possesses an associated member, the UNESA (Spanish association of electric industry). Each member country has a national committee formed by representatives of electric companies from each country.

Currently, there are five areas that cover the electric power companies in the commission (generation, transmission, distribution, commercialization, and corporate area).

The products and services the CIER provides are database, technical work, memorials and articles of the commission events and electric bills, training courses, development projects, information and technology exchange, but all connected to the electric industry. The projects developed by CIER are financed by the foundation and in some cases are supported by WB, CAF and the European Community.

(e) South American Council of Infrastructure and Planning (COSIPLAN)/Initiative for Integration of Regional Infrastructure in South America (IIRSA)

COSIPLAN is a UNASUR body created in 2009 during a presidential meeting of UNASUR, when it was defined the substitution of the IIRSA Executive Direction Committee for a Council at ministry level. With this measure, the member countries sought to give greater political support to the activities developed in the infrastructure integration area, to ensure the necessary investments for the execution of priority projects defined in a Strategic Action Plan for the next 10 years in the Priority Projects Calendar that functions as a promoter of regional infrastructure integration, strategic for the South American development.

The COSIPLAN replaced IIRSA, designed as a forum for coordination and exchange of information about infrastructure among the twelve countries of the region (Ministry of Planning, 2012).

IIRSA, in order to promote the development of transport, energy and communication infrastructure within the regional context through intergovernmental actions, arises from the meeting of the twelve heads of state of South America in 2000; at the time, joint initiatives were approved to boost the political, economic and social integration process in the region, including the modernization of regional infrastructure, and the development of isolated regions (MP, 2012).

The idea of its foundation stemmed from the Brazilian experience in territorial planning, known as Axis Study,

conducted by the Ministry of Planning (MP) with BNDES in 2000, that planned the country from regions identified by their economic inter-relationship.

IIRSA not only performs coordination mechanisms through strategic designs, but seeks to promote the exchange of information between the governments involved to boost development. The initiative has certain principles involving the approach between the countries that are based on open regionalism, contemplating the need to minimize internal barriers to commerce, bottlenecks in infrastructure and regulatory systems and operation, in the Integration and Development Axis (IDA) which are distributed on the South American space in multinational groups that concentrate current and potential trade flows to promote the development of business and productive chains, the economic, social, environmental and political-institutional sustainability (MP, 2012).

IDA is a special division of the South American territory organized into 10 axes (Andean, Amazon, Peru-Brazil-Bolivia, Capricorn, Guyanese Shield, South Andean, Central Interoceanic, MERCOSUR-Chile, Parana-Paraguay Waterway and South), see Figure 10.

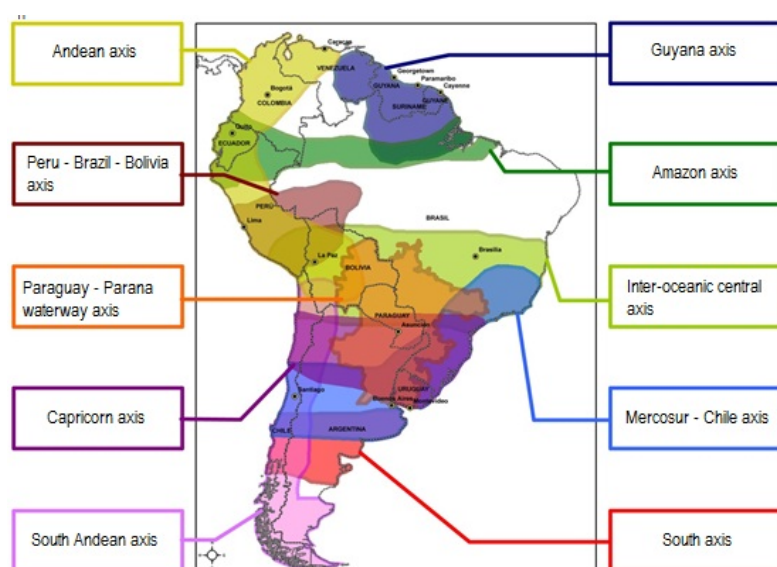


Figure 10 Integration and Development Axis (IIRSA, 2012)

IIRSA, over ten years, and currently the COSIPLAN, developed important projects, with a portfolio of 579 projects, see Table 4, in study (23.5%), pre-running (28.8%), running (29.2%) and completed (18.5%), with an approximate investment of US\$ 163.069 billion (IIRSA, 2014). According to the latest report of COSIPLANs projects portfolio (2013), the energy sector concentrated 59 projects, of which 27 (46% of the total) are aimed at generating, representing 75% of the total investment, and 32 interconnections projects. These projects receive investment especially from public/private partnerships (68% of total investments) followed by the public sector (25%), see Table 5; this characteristic is due to the high value of the individual projects and the fact that they are structuring, with market opening bias, creating conditions for businesses and society to have access to new regions and can dispose their productions. Projects in the energy sector are mainly based on the construction of new interconnections, 52.5% of the total projects and 25.1% of investments. Hydroelectric plants, because they are characterized as large enterprises of electricity generation, hold 27.1% of the projects portfolio and 63.8% of investments see Table 6.

Table 4 Projects Portfolio of COSIPLAN (IIRSA,2014)

| Year | Number of projects | Estimated investment (x10 ³ US\$) |
|------|--------------------|--|
| 2004 | 335 | 37.425 |
| 2007 | 349 | 60.523 |
| 2008 | 514 | 69.000 |
| 2009 | 510 | 74.542 |
| 2010 | 524 | 96.119 |
| 2011 | 531 | 116.121 |
| 2012 | 544 | 130.139 |
| 2013 | 583 | 157.731 |
| 2014 | 579 | 163.069 |

Table 1 Characteristics of the Type of Financing (COSIPLAN, 2013)

| Energy sector | Projects | | Investment | |
|-----------------|----------|------|------------|------|
| | Number | % | (MM US\$) | % |
| Private | 7 | 12% | 3.435 | 7% |
| Public | 38 | 64% | 12.871 | 25% |
| Public/ Private | 14 | 24% | 34.524 | 68% |
| Total | 59 | 100% | 50.830 | 100% |

Table 2 Kinds of projects from Energy Sector (COSIPLAN, 2013)

| Energy sector | Projects | | Investment | |
|------------------|----------|-------|------------|-------|
| | Number | % | (MM US\$) | % |
| Generation | 27 | 45.8% | 37.965 | 74.7% |
| Hydropower | 16 | 27.1% | 32.418 | 63.8% |
| Thermoelectric | 5 | 8.5% | 2.476 | 4.9% |
| Nuclear | 2 | 3.4% | 1.740 | 3.4% |
| Other | 4 | 6.8% | 1.332 | 2.6% |
| Interconnections | 32 | 54.2% | 12.865 | 25.3% |
| New | 31 | 52.5% | 12.740 | 25.1% |
| Adaptation | 1 | 1.7% | 125 | 0.2% |
| Total | 59 | 100% | 50.830 | 100% |

4. Electrical Integration in South America

Interconnections are physical unions, a set of equipment to link the power systems, allowing the exchange of energy between the interconnected electrical systems through plants and transmission lines, containing equipment such as control of substations (with or without transformation), voltage regulation equipment and frequency converters.

Cross-border interconnections are no different from the internal transmission system of a country, such as the National Interconnected System (SIN) in Brazil, see Figure 10, that due to its large size, ensures the complementation of energy resources distributed throughout the country, improving security of supply to users through access to a more efficient electrical service, by providing energy surpluses and use of installed capacity to the neighboring countries. SIN, if replicated to the South America, would ensure the hydrothermal and hydro geographic complementarity due to the dispersion of water basins and natural gas reserves in the region, in addition to the non-simultaneity of maximum demands for hourly and seasonal difference of four time zones. For these

interconnections to occur, it is necessary to grant authorizations, permits and concessions for the construction, operation and exploration of interconnections that join the electrical systems of different countries. Ideally, the rules would reach to facilitate free trade of electricity between power companies between countries, respecting the technical and environmental regulatory standards as well as the principles of non-discrimination and reciprocity, to ensure the support of the projects.

Currently, the distribution of cross-border interconnections in South America, see Figure 11, can be divided into two regions: the Andean countries (Colombia, Ecuador, Peru and Venezuela), and MERCOSUR countries plus Chile. Apart from these two regions, it is worth highlighting the interconnection between Brazil and Venezuela that links Guri (Venezuela) to Boa Vista (Brazil). These interconnections provide the purchase and sale of energy, improving of the use of generation resources, increase the reliability of electrical systems and, especially, enable the promotion of infrastructure in economically in deficit countries.

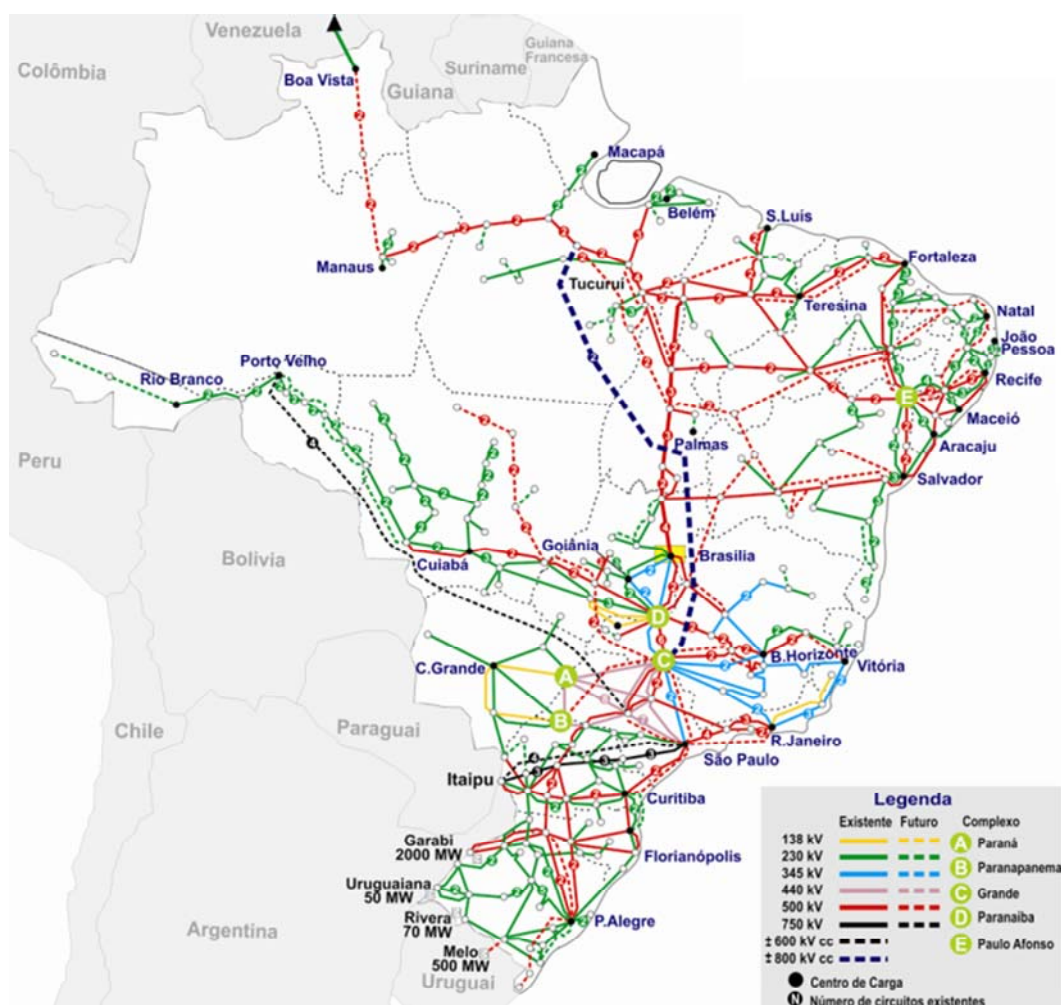


Figure 11 SIN (ONS, 2014).

The interconnections of the Andean region are characterized by service on an emergency basis, mainly due to network stability problems; in the MERCOSUR region, because it has large electrical links with large hydroelectric binational power plants (Itaipu, Yacyreta and Salto Grande) and their lines of transmission, energy trading operations are constant.

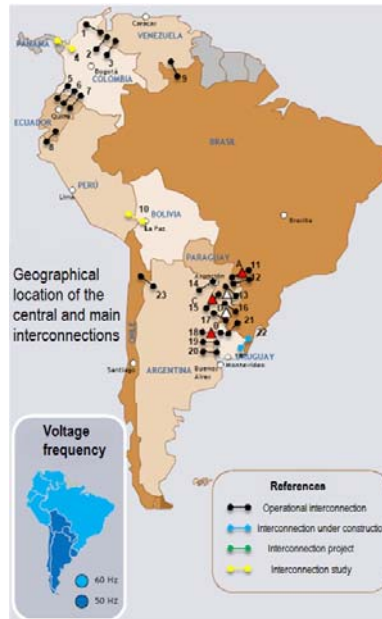


Figure 12 Cross-border Interconnections in South America (CIER, 2010)

4.1 Underway Projects

According to the database COSIPLAN (2014), there are 12 EI projects in progress, totaling \$27.327 billion, of which three are consistent with the criteria established in the methodology, the others being primarily related to plant electricity generation.

(a) Electrical Interconnection Ecuador-Peru

This implemented bi-national project is intended to carry out the electricity exchange synchronously to harmonize regulations, ensure energy supply, and develop mechanisms to importation and exportation between Ecuador and Peru through this construction, with 500 kV voltage level.

The type of funding is public, with the participation of the two countries through their national treasures; studies on the interconnection were made by CELEC EP, electric corporation of Ecuador which covered all costs. This structure will be part of the framework of the initiative of the Andean Electrical Interconnection System (AEIS) (COSIPLAN, 2014).

(b) Electrical Interconnection Colombia-Venezuela

This bi-national scope project involves the construction of an electrical interconnection of 34.5/13.8 kV between San Fernando de Atabapo in Venezuela until Inírida, Guainía department in Colombia.

This line will provide the electricity produced by the power plant of Inírida, Colombia, by offsetting the costs generated by the supply of Venezuelan fuel for the domestic price of San Fernando de Atabapo, since the energy will serve to feed this city (COSIPLAN, 2014).

(c) Electrical Interconnection Uruguay-Brazil

This ongoing project is a binational project to build an electricity interconnection line between Uruguay and Brazil which aims to diversify the electricity trade as much uninterrupted as through firm contracts tied with Argentina.

This project enables more export markets for any surplus of Uruguayan plants, and stops the Brazilian secondary energy at times of surplus hydroelectric and thermal generation associated with unused plants. The

holding companies of this line are the Brazilian companies Eletrobras and the Uruguayan ETE.

The type of funding is public with the amount of US\$ 349 million, and the stakeholders are:

- CAF, with US\$ 30 million approved;
- The National Treasury of the two countries, with US\$236 million in progress;
- FOCEM, fund tied to MERCOSUR, with approved US\$ 83 million.

The project includes the construction of a 500 kV network; totaling 60 km from San Carlos, in Uruguay, until the frequency conversion station, since the two countries operate with frequency of 50 (Uruguay) and 60 (Brazil) Hz, and another network of 230 kV with 9 km to the substation President Medici in Brazil.

ELETROBRAS is responsible for the work and has received authorization from ANEEL to import and export electricity through this line by Authorizing Resolution No. 2,280 / 2010.

The National Coordination (CN) of the project are the Ministry of Transport and Public Works (Uruguay) and the Ministry of Planning (Brazil).

4.2 Completed Projects

According to the database of COSIPLAN (2014) of EI, we have completed 21 projects, totaling US\$22.617 billion; only two of these projects are consistent with the criteria established in the methodology, since two of them are dams already built, pre-formation of IIRSA (Itaipú and Yacyretá), and the third, because it is a pipeline (Nor-Peruano) between Ecuador and Peru.

(a) Electrical Interconnection Project Colombia-Ecuador

The bi-national scope project to build a 230 kV transmission line between the substations Pasto (Colombia) and Quito (Ecuador) came into operation in 2007. The project goal was to provide energy to Ecuador in times of rationing and replace the generation of electricity from fossil fuels, and in the rainy season export power to Colombia.

The line is 213 km long with an initial capacity of 200 MW; in 2009 energy exports to Ecuador totaled 1,076 GWh.

Project funding came from the National Treasury of both countries, providing US\$ 45.400 million (IIRSA, 2012).

The export of electricity to Ecuador in 2009, even with water scarcity in Colombia, was 1,077 GWh, a figure higher than the first two years of line operation, when there was no shortage of water.

The responsible for the project are the Ministry of Transport and Public Works (Colombia) and the National Planning Department (Ecuador).

(b) Electrical Interconnection Project Colombia-Venezuela

The bi-national scope project consisted on the adequacy of the interconnection line Cuestecitas y El Corozo - San Mateo, with 230kV.

Funding for this project was public, with the participation of national treasures of both countries, with invested amount of US\$ 125.2 million.

Exports to Venezuela through this interconnection amounted to 222.25 GWh in 2009; in 2010 there was no exchange of energy because of water scarcity in the period; in 2012 ISAGEN, Colombian electric company, and CORPOELEC, Venezuelan Electric Corporation, established a monthly supply contract of 30 GWh from Colombia to Venezuela.

(c) 500 kV Transmission Line (Itaipu - Asuncion)

The bi-national scope project consisted of the construction of a line of electricity transmission between Brazil

and Paraguay, to improve the quality of service and reliability of supply, correcting the low system voltage, and reducing the high transmission technical losses, which reach 10% during peak hours.

Transmission lines are already operating at 85% capacity, and interconnection transformers Itaipu are already operating on the edge since 2011.

The construction consisted in a transmission line of 500 kV from Itaipu to Villa Hayes, station area of Asuncion, and the expansion of the Villa Hayes station. The additional transmission capacity will increase the exchange of energy with Argentina through the 220kV interconnection. The system has a length of approximately 345 km.

The project financing was public and investments amounted to US\$ 555 million distributed among (IIRSA, 2012):

- The National Treasure of the two countries, with US\$155 million in implementation;
- FOCEM, with US\$ 400 million running.

The completion of the project took place in 2013 and the responsible for the project are the Ministry of Public Works and Communications (Paraguay) and the Ministry of Planning (Brazil).

4.3 Future Projects

In this context, we will cover construction projects for future hydroelectric facilities and transmission lines in South America.

(a) Construction of Hydroelectric Plant Corpus Christi

The project aims to build a binational hydroelectric plant. This plant will be built in the Paraná River, the natural border between Argentina and Paraguay. The estimated cost for this construction will be US\$4.200 billion and will be funded by the national treasure of the two countries.

The discussion of its construction dates back to the same period as the construction of Itaipu and Yacyretá, but Paraguay and Argentina chose to carry forward the signing of the Treaty of Yacyretá and not of Corpus Christi, because at the time that construction would cripple the Itaipu project. To reach a diplomatic agreement the three countries signed a tripartite diplomatic agreement in 1979 (Oxilia, 2007).

Study completed in 1984 estimated that the installed capacity of the plant will be 4,608 MW generating annual average of 20,100 GWh. This project added to Itaipu, Yacyretá and Itacorá-Itatí, will achieve a generation of energy greater than 123,000 GWh/year. This project is a big step for MERCOSUR's EI.

Until today the two countries are completing the basic studies and preparing the treaty for the execution of the project. The environmental impact study has already been done.

(b) Hydroelectric Binational Garabi-Panamby - Argentina-Brazil

Hydroelectric plants Garabi and Panambi, see Figure 13, of binational level, aims to harness the potential of the Uruguay River, with a total installed capacity of 2,200 MW at a cost of US\$ 5,202 million.

The hydroelectric plant Garabi, has 1,152 MW of installed capacity and generation capacity of 5,970 GWh/year, with total investment of US\$ 2,728 billion; Hydroelectric power plant Panambi, on the other hand, will have 1.1048 MW of installed power generating capacity of 5,475 GWh/year, requiring investment of US\$ 2,474 million. These two projects will be funded by the public sector of both countries, in which case the Brazilian side the work is part of the GAP 2 (growth acceleration program) being financed by BNDES (COSIPLAN, 2014).

In November 2012, the governments of Argentina and Brazil showed the feasibility study schedule of hydroelectric exploitations of Garabi and Panambi that began in 2013, and is expected to start operation in 2020 (Eletrobras, 2012).

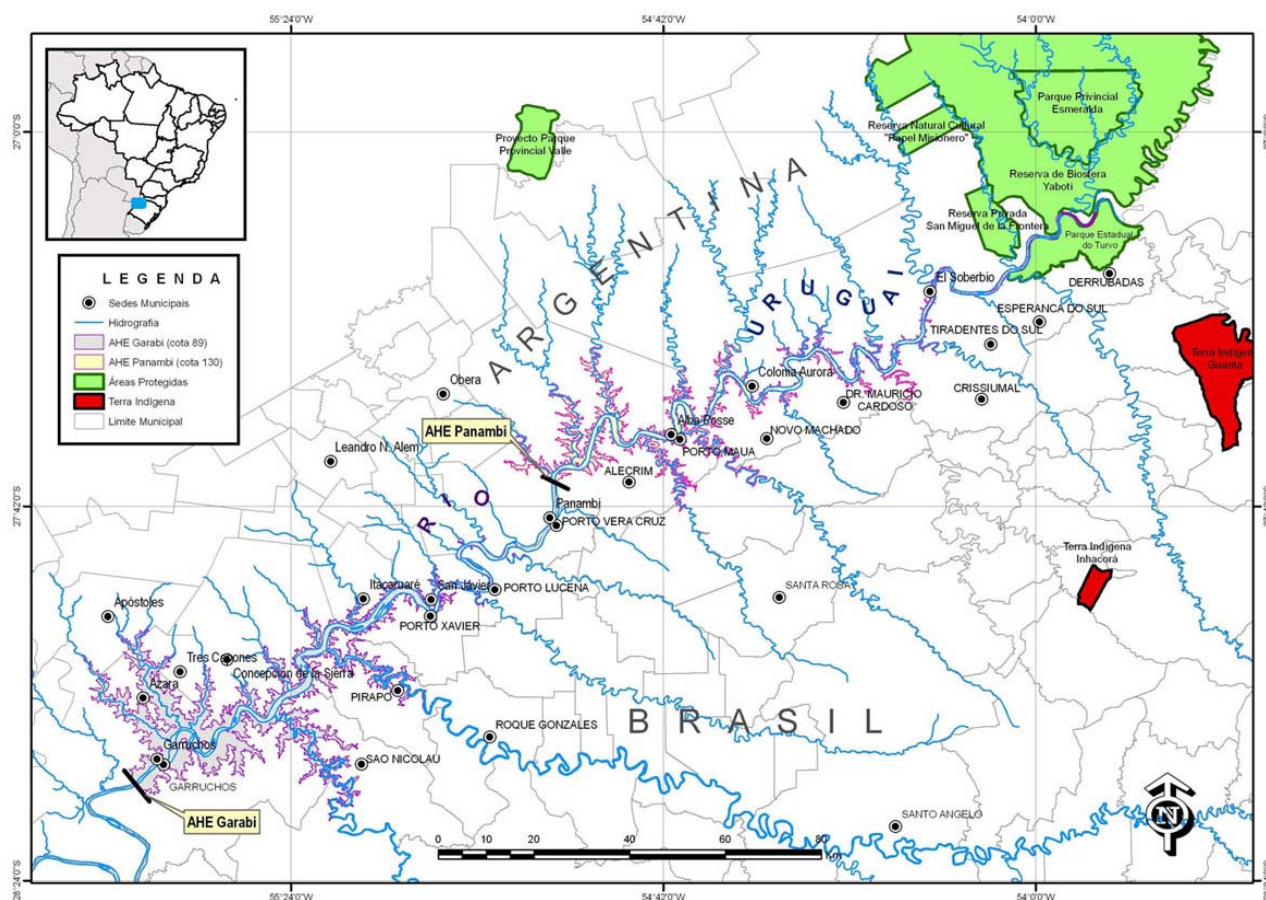


Figure 13 Hydroelectric Plants Garabi and Panambi (Eletrobras, 2012)

The project has the Joint Technical Committee (CTM), responsible for feasibility studies and basic designs, environmental studies and social communication.

(c) Project Peru-Brazil

Currently the Brazilian government is studying the feasibility of building hydroelectric plants in seven countries in South America: Argentina, Bolivia, Colombia, Guyana, Peru, Suriname and Venezuela. The plants would generate about 12,000 MW and would be built by local contractors to supply both the domestic market of the country as well as the Brazilian. Eletrobras will be responsible for the construction and financing would come from BNDES.

Among the projects, six plants are in Peru: Inambari (2,000 MW), Sumabeni (1,740 MW), Paquitzapango (2000 MW), Urubamba (940 MW), Vizcatán (750 MW) and Cuquipampa (800 MW); together these plants would total approximately 9,000 MW of installed capacity (Eletrobras, 2009).

In 2010, the presidents of both countries signed an agreement for the construction of these plants with US\$15 billion investment. However, Peru has canceled the provisional license of the Inambari consortium, earlier design, due to protests in Puno department claiming that the plants would be more beneficial to Brazil than to Peru, since the environmental cost would be borne only by Peru.

The Inambari power plant, in terms of power generation, will be the largest dam in Peru and the fifth largest in Brazil, with a reservoir of 413 square kilometers. It is not yet set, but it is estimated that 80% of the energy produced

will be exported to Brazil and much of the resources used for its construction would come from the BNDES.

This plant is strategic for Brazil, not only for its energy supplies, but to be upstream of the Madeira river, damming water to promote the best hydroelectric utilization Jirau and Santo Antônio during periods of drought (Furnas, 2010).

Companies involved in this building are: Odebrech Peru, and Andrade Gutierrez, OAS, Eletrobras, Eletrobras Furnas.

(d) Other projects via Eletrobras (Brazil)

Eletrobras, a public company controlled by the Brazilian government operates in the generation, transmission and distribution of electricity (Furnas, 2010).

This company is important in the EI scenario because holds half the capital of Itaipu Binational.

In the six countries cited in the text, Eletrobras studies (Eletrobras, 2012):

- Bolivia: implementation of hydroelectric waterfall Hope with 800 MW and the Binational Guajará-Mirim 3,000 MW, with an estimated investment of US\$ 5,000 million;
- Guyana: feasibility of a plant with 1,500 MW, and be mapping the hydroelectric potential the country, estimated at 8,000 MW;
- Suriname, Venezuela, and Colombia: are still in studies on the hydroelectric potential.

The generation provided by energy produced in Guyana would be imported into Brazil to the state of Roraima, to supply the state that uses mainly electric thermal fuel oil and imports from Venezuela. This state is an isolated system, so it is not connected to the SIN.

5. Conclusions

After the various data provided, it was observed that the integration of South America will be a difficult task, given that over the last 60 years various bodies of regional cooperation were created. These organizations held numerous agreements and political, economic and social treaties as a means of integration of the region, and over time many of these initiatives ended due to diplomatic problems or the annexation by larger supranational bodies.

UNASUR, the greatest organism in South America, has a great convergence among member countries, such as Argentina, Brazil, Bolivia, Ecuador, Uruguay and Venezuela, protectionist countries in the bloc, as Chile and Colombia are more aligned to the neoliberal line.

UNASUR, due to legacy and annexation of IIRSA, an institution that through technical work together with the 12 member countries has a portfolio of 579 integration projects for the region; it allowed the countries to discuss and structure in a common language. On the one hand its technical nature can create such resources, on the other hand, it cannot give sequence to the implementation of projects, despite the large inflow of encouragements agencies and regional banks such as the IDB, CAF and BNDES for the preparation of projects, because it does not have financial support for feasibility of the projects.

EI in the region, specifically in the implementation of binational hydroelectric, the negotiation process between countries is very complex, because it touches on issues related to environmental impacts, sovereignty and funding. Large binational plants were only built thanks to a convergence of political ideals present in South America between the 60's and the 80's. These ideals approached countries as they were aligned with the US, which facilitated the sources of financing (via WB and IDB), technical and diplomatic support. Another very important factor of the season was the emergence of large public companies that took the lead of large projects, thus enabling the

negotiations and borrowing.

Today, large EI projects related to hydropower belong to Eletrobras, as part of the international expansion plan of the company, for the supply of electricity from the Southeast and isolated northern states of the country. Most studies on potential energy and construction of transmission networks are being made in countries such as Suriname, Venezuela, Bolivia and Peru, with planned capacity of over 20 GW.

The South America EI is an extremely important factor as it ensures energy security of the region. For countries with limited access to loans and low domestic demand in the short and medium term, EI provides investment and construction of the project, and in the long run makes possible the sale of energy to other countries in the region and/or domestic consumption. In this matter, Brazil has a strong political and economic clout in the region, a fact proven only with the analysis of the number of projects and investment in the project presented by the BNDES and Eletrobras, and the trade surplus of the country in relation to neighboring countries.

There is quantitative evidence that the least developed countries in South America, with the lowest HDI, which consume less electricity per capita, are precisely those that have large energy reserves. This feature allows the marketing of its resources with the countries of the region with high energy demand and lack of reserves, thus ensuring the reliable and efficient supply for energy consumers, reducing the dependence on a single energy source and reducing supply costs. The economic gains for countries that sell their energy resources or their excess electricity enable the development of other structural areas, and once established the physical integration in the region, the enhancement of trade relations, political, social and cultural relations between its members are enlarged.

Therefore, the EI needs articulation of rules and congruent policies, such as agreements, frameworks and regulations aimed at opening markets and supply assurance. This congruence appears with the creation of common rules to the region's countries, facilitating transactions and investment of state capital, private national and multinational, through the reduction of differing interests among States and stakeholders.

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Country Risk Analysis in Emerging Markets: The Indian Example

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Abstract: The Beta Country Risk Model, as described by Erb, Harvey and Viskanta (1996) and used by Andrade and Teles (2004) for Brazil, is used to estimate the country risk of India based on several macroeconomic indicators. Ordinary least squares regression is run on the white noise (unexpected component) of these variables to explain the variation in country risk to identify the most relevant of these variables. The study shows that the variation in country risk of India is highly correlated with changes in Forex Reserves, Exchange Rate, Current Account Balance, Unemployment rate and GDP Deflator. The effect of political risk on overall country risk is also studied.

Key words: country risk; country beta model; risk modeling

JEL codes: F59, F69 and G18

1. Introduction

Globalization and increasing financial unification has led to a rapid growth of international lending, foreign direct and institutional investment. With this, economies across the globe are increasingly becoming interdependent and developments in one part of the world affect returns in another. Given this, country risk analysis provides insights into that part of the risk of an investment specific to a certain country. “**Country Risk**”, in general refers to the risk associated with those factors that determine or affect the ability and willingness of a sovereign state or borrower from a particular country to fulfill their obligations towards one or more foreign lenders and/or investors; this is the approach and the definition used by Bates and Saini (1984) as well as by Abassi and Taffler (1982). This shall also be the definition used in this paper. The analysis of country risk consists of the assessment of the political, economic and financial factors of a borrowing country or FDI¹ host. These factors give an indication of the stability and profitability in an economy. As Harvey and Viskanta (1996) point out, “non-diversifiable systemic risk” arises out of the factors over which borrowers have little control, and country risk may also represent such “non-diversifiable systematic risk”.

Emerging Markets country risk analysis provides a challenge for researchers, according to Euler Hermes², since calculation of statistical properties of the various parameters based on historical returns could be misleading. In addition, reliable data is not available for several periods, especially far back into the past. Such data might not

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¹ Foreign direct investment is that investment, which is made to serve the business interests of the investor in a company, which is in a different nation distinct from the investor's country of origin.

² Euler Hermes is a French credit insurance company. The article can be accessed at http://www.eulerhermes.com/en/press/press_20090112_00100060.html.

even be relevant as, by their very nature, the past in emerging economies rarely reflects the present and to a lesser extent, the future.

The **Country Beta Approach** is a quantitative method of country risk analysis in which the difference between the returns of a country's equity market and the world equity market is attributed to the country risk. This difference indicates the returns in a country specific to it and different from the rest of the world. This model has first been described in the seminal paper by Erb, Harvey and Viskanta (1996b). This model has been applied to Australia by Gangemi, Brooks and Faff (2000) to examine the effects of foreign debt on country risk, to Latin America by Verma and Sydermir (2006) to study the economic determinants of a time-varying country beta and to Brazil by Andrade and Teles (2004) to study the effect of interest rates. But such an analysis has not been previously done for India. India provided an interesting case for country risk and studying those factors affecting country risk in an emerging economy, through the liberalization phase in the early 1990s.

This study examines the relationship between country risk and macroeconomic variables and identifies those variables that affect country risk the most, using Ordinary Least Squares (OLS) regression on the white noise of the variables. In addition, the impact of political risk is also studied. It can be seen that FDI inflows, interest rates (monetary policy), exchange rates and the unemployment rate impact country risk the most. Section 2 gives a brief history of the studies done in this field. Section 3 describes the country beta model, the methodology used to white the time series of the variables and the final regression. Section 4 gives an analysis of the results obtained using this model. Certain limitations and future scope for this study are presented in section 5.

2. Literature Review

Country risk analysis has been defined and studied in several different ways since the latter part of the previous century. Ribeiro (2006) categorized some standard economic variables that often could be found in most of the diverse approaches adopted by financial institutions and rating agencies (such as Goldman Sachs, Merrill Lynch, S&P and Fitch Ratings) into **External sector** (exports, imports, debt services, direct investments, loans, repayment of loans, external debt and flow of foreign reserves), **Internal sector** (interest rate, public debt and its service, level of investments, budget equilibrium, internal savings, consumption, GDP/GNP, inflation rate, money supply, etc) and **Other variables** (population, life expectancy, rate of unemployment, level of literacy, etc). Teixeira, Klotzle and Ness (2008), identified the determinant factors of the country risk for selected emerging markets. Three models were used to estimate country risk—in the first model the relation between country risk and fundamental economic variables was tested; in the second model the external component was added to the group of explanatory variables; and the third model tested the relation between specific country risk and the economic fundamentals. The results found for emerging markets indicated that four domestic factors are consistent determinants of country risk and specific country risk—growth rate, external debt, public debt and international reserves.

Various methods used for country risk appraisal may be categorized into one of four types—Fully Qualitative Method, Structured Qualitative Method, Checklist Method and Other Quantitative Methods. The popular quantitative methods used for country risk analysis are listed by Nath (2008). Artificial Neural Networks are extensively used for country risk analysis. Yim and Mitchell (2004) investigated the possibility of outperformance of traditional statistical models by two artificial neural networks, multilayer perceptron and hybrid networks, for predicting country risk rating. The results in sample indicate that the hybrid ANN – ANN-Logit-Plogit—produced

the best results. This supports the conclusion that for researchers, policymakers and others interested in early warning systems, hybrid networks would be useful. Another novel model used for country risk analysis is the country beta model described by Erb, Harvey and Viskanta (1996). This model was applied to estimate the country risk of Brazil from 1991 to 2002, by Andrade and Teles (2004). The four variables used for the model are foreign reserves, world oil prices, nominal interest rate and public debt. Three different specifications of the model were analyzed — one including all the 4 variables, one without public debt and one without interest rate. The following observations were made — one, the effects of forex reserves is very small since the adoption of the floating exchange rate regime, and two, unanticipated increase in interest rates reduces country risk.

This paper uses the same model, as has been used by Erb, Harvey and Viskanta (1996) and Andrade and Teles (2004) for estimating Brazilian country risk, for analyzing India's country risk.

3. The Model

Country Beta Model of Erb, Harvey and Viskanta (1996) is described below. As stated earlier, this is the model used in the study of Brazilian country risk and is also used to estimate India's country risk. The data period for the study in the Indian context is between 1984 and 2008.

3.1 The Country Beta Model

Erb, Harvey and Viskanta (1996) have shown that the difference between the returns of a country's equity market and the world equity market may be attributed to the country risk. This relation may be expressed as follows:

$$R_{\text{Equity_Country}} = \alpha + \beta R_{\text{Equity_World}} + e_t \quad (1)$$

β is the basic measure of country risk, since it indicates the returns in a country specific to it and different from the rest of the world. As β increases, country risk decreases, that is, the returns in the country are affected only by factors common to the rest of the world, which is essentially a non-diversifiable risk for a particular country.

Country risk would be a variable affected by certain macroeconomic variables specific to the country. Thus, beta is modeled as a linear combination of those variables:

$$\beta = b_0 + b.X \quad (2)$$

Where X represents a vector of macroeconomic indicators.

This was applied to the Indian context and the following model was used to estimate country risk:

$$R_{\text{India}} = \alpha + \beta R_{\text{World}} + e_t \quad (3)$$

Where R_{India} is the return on the Indian equity market and R_{World} is the return on the world equity market. β is an indicator of India's country risk. As β increases, country risk decreases. The variables that go into the vector of macroeconomic indicators, X, are described in Section 3.2. Equation (2) is substituted in (3) and subject to OLS regression analysis to determine those variables that affect β , and thus, the country risk.

Based on the *Efficient Market Hypothesis* (Fama, 1965), only unexplained shocks in the explanatory variables affect country risk, since market expectations get incorporated into R_{India} and R_{World} . Thus, an Auto-Regressive Integrated Moving Average (ARIMA) model is run on each of the variables to filter out the expected components.

3.2 Data

The regression was run on two different models based on significance of explanatory variables. Annual

macroeconomic data for the variables was collected from the *World bank site*³.

The variables used are the following, forming the initial macroeconomic indicator vector, X , used in equation (2):

- (1) GDP
- (2) GDP deflator
- (3) Public debt
- (4) Current Account Balance
- (5) Interest rates
- (6) Forex reserves
- (7) Exchange Rate (against the USD)
- (8) FDI Inflows
- (9) Unemployment
- (10) Political Risk Index (PRI)

Interest rates and exchange rates give an indication of the monetary policy, while public debt and current account balance reflect the fiscal policy of the economy—the case is the same in India as well.

FDI inflows indicate how foreign economies perceive the local economy and the story holds for the Indian economy too.

Data on the macroeconomic indicators i through ix listed above were collected from 1991 to 2013. The data for PRI (10) was available for years from 1996 to 2013 (Table 1), provided by the *Economist Intelligence Unit*. Its index of “Political Stability and Absence of Violence” was used as a proxy for country risk. This indicates how non-business political events such as wars, regime changes and terrorist attacks affect profitability of businesses.

Table 1 Political Risk Index

| Year | Political Risk Index |
|------|----------------------|
| 1996 | 0.80 |
| 1998 | 0.75 |
| 2000 | 0.65 |
| 2002 | 0.35 |
| 2003 | 0.30 |
| 2004 | 0.35 |
| 2005 | 0.50 |
| 2006 | 0.50 |
| 2007 | 0.55 |
| 2008 | 0.60 |
| 2009 | 0.55 |
| 2010 | 0.55 |
| 2011 | 0.55 |
| 2012 | 0.55 |
| 2013 | 0.55 |

The annual return on the BSE SENSEX index was used for R_{India} and the return on the NYSE index was used as a proxy for R_{World} .

³ <http://info.worldbank.org/governance/wgi/pdf/c104.pdf>.

Each of the economic variables was subject to the ARIMA smoothing using the Box-Jenkins Methodology, as described by Box and Jenkins (1970), wherever applicable.

All regressions were run using the R statistical software.

3.3 Whiting the Time Series (ARIMA)

A thorough observation and graphing of data showed that a lot of these variables were non-stationary, i.e., they are *integrated*. As shown by Andrade and Teles (2004), under the assumption of the *Efficient Market* hypothesis, only unanticipated shocks of the variables are expected to affect returns. Simply put, this means that there would be a need to make the data stochastic or stationary in this case. The deterministic trend in these variables needs to be eliminated. That being the case, the econometric model should consider only the non-anticipated components of the related series. Therefore, to white the series Box-Jenkins (B-J) procedure was applied and a univariate ARIMA process for each macroeconomic series was obtained.

The chief tools in identification are the autocorrelation function (ACF), the partial autocorrelation function (PACF), and the resulting correlograms, which are the plots of ACFs and PACFs against the lag length — the approach used is the one described in Gujrati (2007). The “I” part of ARIMA can be set by differencing the time series until it became non-trended, using R. Identification of ARMA is done based on the following table which talks of pattern recognition.

Table 2 Theoretical patterns of ACF and PACF

| Type of model | Typical pattern of ACF | Typical pattern of PACF |
|---------------|---|-----------------------------------|
| AR(p) | Decays exponentially or with damped sine wave pattern or both | Significant spikes through lags q |
| MA(q) | Significant spikes through lags q | Declines exponentially |
| ARMA(p, q) | Exponential decay | Exponential decay |

The ACF and PACF functions for each of the time series data were calculated and analyzed to match with one of the typical patterns from Table 2. After a tentative Box-Jenkins model has been fitted, it is subjected to various diagnostic checks (based on ACF and PACF) as formulated by Box and Pierce (1970) & Box and Jenkins (1970) to test its adequacy as a stochastic representation of the process under study. If the model is found to be inadequate, analysis of the model residuals suggests ways to modify the model structure to obtain a new tentative model which will likely do an improved job of representing the process. Multiple combinations of (p, q) were tried to identify the ARIMA process underlying the series. The following Table 3 gives the final ARIMA model used for each of the macroeconomic variables.

Table 3 ARIMA Models for the Macroeconomic Series

| Macroeconomic Variable | ARIMA (p,d,q) |
|--------------------------|---------------|
| GDP | (0,1,1) |
| GDP Deflator | (1,1,0) |
| Public Debt | (0,1,0) |
| Forex Reserves | (0,1,0) |
| Exchange Rate | (0,1,0) |
| Unemployment | (0,1,1) |
| FDI Inflows | (2,1,0) |
| Current Account Balance | (0,1,0) |
| Short Term Interest Rate | (0,1,1) |

The series obtained after filtering the deterministic components correspond to “white noise”, i.e., the stochastic components or unanticipated shocks in the markets. This way, our analysis would involve only stationary data and hence avoid ‘spurious regression’. The difference between the actual time series and the series whited using ARIMA is given in Exhibit 1.

The Beta for the country risk estimation involves the following macroeconomic explanatory variables. The table below gives the ARIMA results of these estimators. The final values used in the Beta estimation are obtained by adjusting the data points according to the ARIMA results.

3.4 Regression Results

Using the ARIMA-smoothed time series from above, different regressions were run to find the model that fits the data best. The following two models were found to give the highest R^2 (adjusted) as well as reasonable significance of the variables. The results from the two regressions are summarized below.

Table 4 Model 1

| Variables | Coefficient | t-value | Model R-square | D-W test | p-value (F test) |
|----------------------|-------------|---------|----------------|----------|------------------|
| Forex Reserves | 0.02704 | 0.520 | 0.06341 | 2.2974 | 0.871 |
| Exchange Rate | 0.03329 | 0.774 | | | |
| Current Acc. Balance | -0.06968 | -1.021 | | | |
| Constant | -0.73773 | -0.786 | | | |

Table 5 Model 2

| Variables | Coefficient | t-value | Model R-square | D-W test | p-value (F test) |
|--------------|-------------|---------|----------------|----------|------------------|
| GDP Deflator | 0.3982 | 0.741 | 0.04756 | 2.3414 | 0.8135 |
| Unemployment | 1.1329 | 0.318 | | | |
| Constant | -0.4157 | -0.437 | | | |

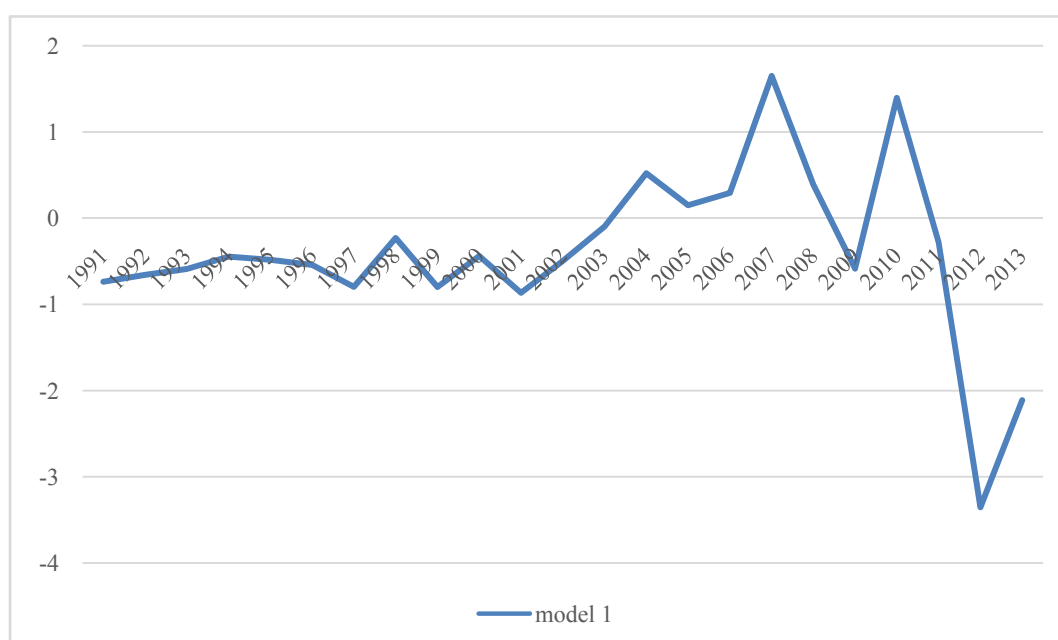


Figure 1 Beta-Model 1

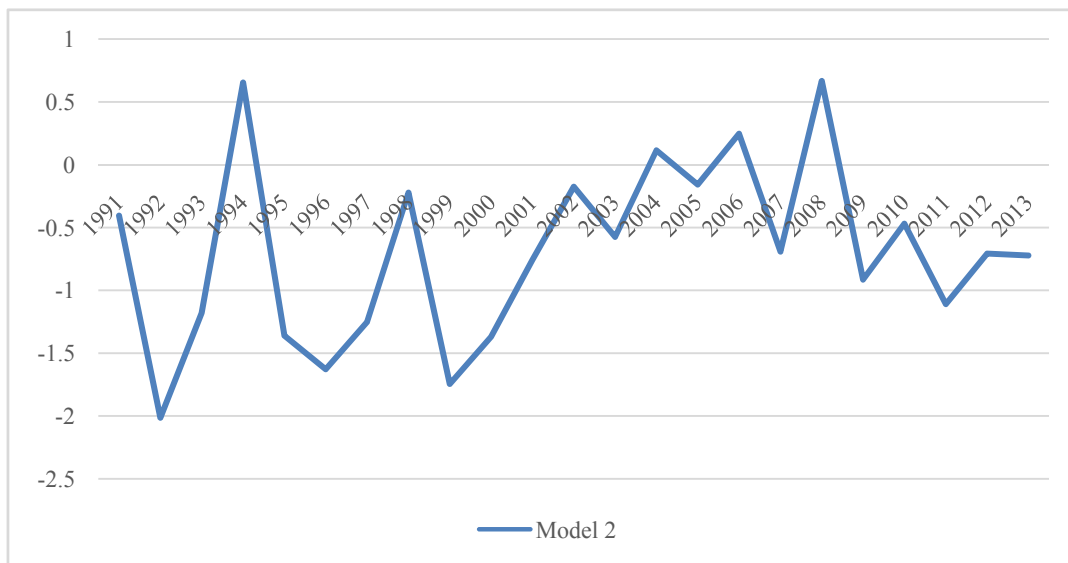


Figure 2 Beta-Model 2

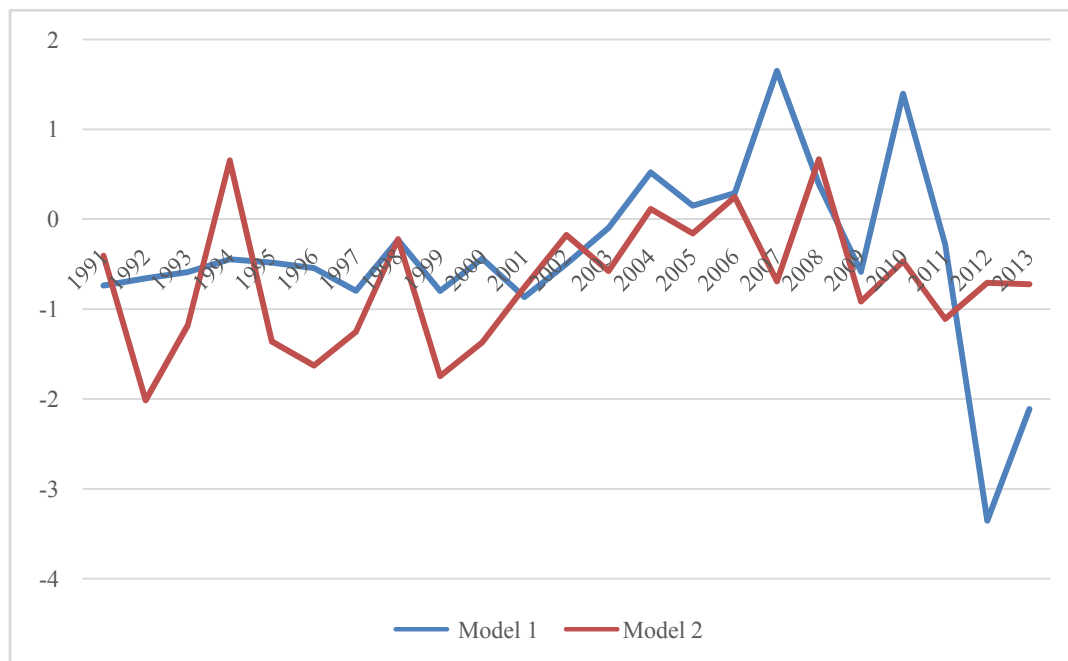


Figure 3 Country Beta-Model 1 vs. Model 2

The two models give similar results, especially after 2002; thus, it appears that the models reasonably estimate country risk in the period from 1991 to 2013, to the extent possible in a mathematical model.

3.4.1 Adding Political Risk

Since the political risk data was available for only 17 years between 1996 and 2013, it was not included in the main regressions. Another regression was run on the sample for the 17 years when the political risk data was available to see how much this index affects country risk. The results are summarized below.

Inclusion of political risk index to Model 1 leads to high multicollinearity, indicated by high R^2 , low significance of the variables and high variance-inflation factors. Thus, it appears that the explanatory variables

(Exchange rate, Forex reserves and Current account balance) determine political risk to a large extent. It is thus not necessary to include political risk in this model.

Upon adding political risk index to Model 2, the variance inflation coefficient of GDP Deflator becomes high, indicating strong correlation with political risk. The significance of the model remains the same and thus, including political risk does not add incremental value to the estimation. This is probably because the political risk is already reflected in other factors like interest rates and FDI inflows.

These results are most likely due to the small sample size; increasing the sample size might give better results.

Table 6 Model 1' (with Political Risk Index)

| Variables | Coefficient | t-value | Model R-square | D-W test | p-value (F test) |
|----------------------|-------------|---------|----------------|----------|------------------|
| Forex Reserves | 0.06468 | 2.425 | 0.4299 | 2.5884 | 0.1854 |
| Exchange Rate | 0.03304 | 1.656 | | | |
| Current Acc. Balance | -0.09615 | -2.716 | | | |
| PRI | -14.81837 | -1.918 | | | |
| Constant | -0.54416 | -1.163 | | | |

Table 7 Model 2' (with Political Risk Index)

| Variables | Coefficient | t-value | Model R-square | D-W test | p-value (F test) |
|--------------|-------------|---------|----------------|----------|------------------|
| GDP Deflator | 0.7132 | 2.214 | 0.2876 | 2.3606 | 0.3167 |
| Unemployment | -1.2022 | -0.464 | | | |
| PRI | -13.9967 | -1.648 | | | |
| Constant | -0.4073 | -0.805 | | | |

The Figures 4 and 5 are the plots of comparison between Beta models (1 and 2 without the PRI component) and Beta models (1' and 2' with PRI component).

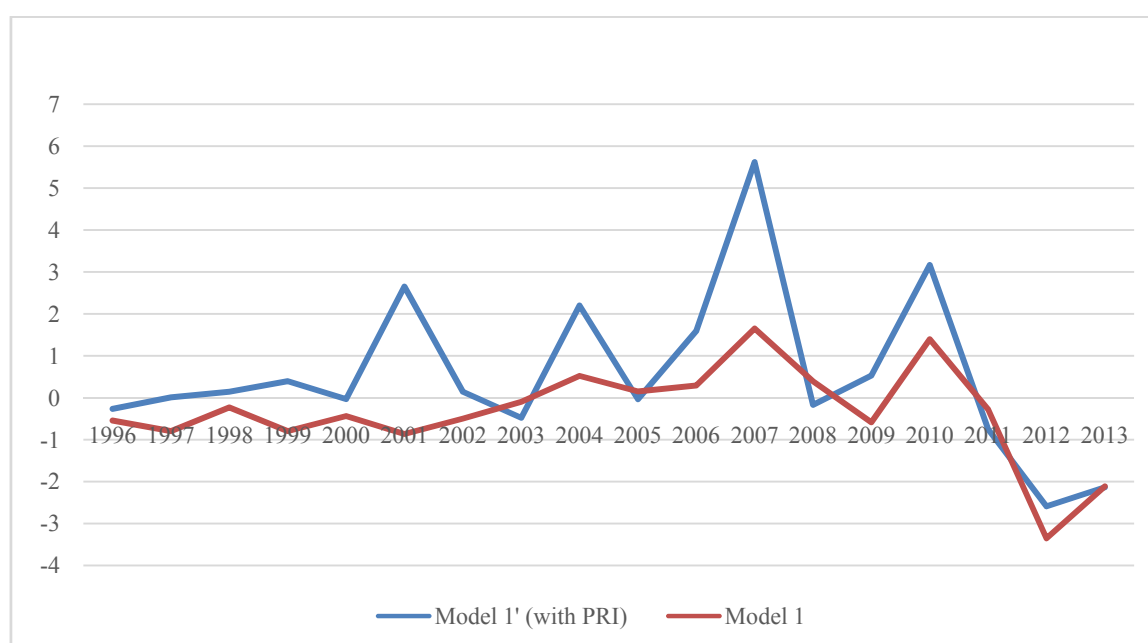


Figure 4 Beta Model Comparison

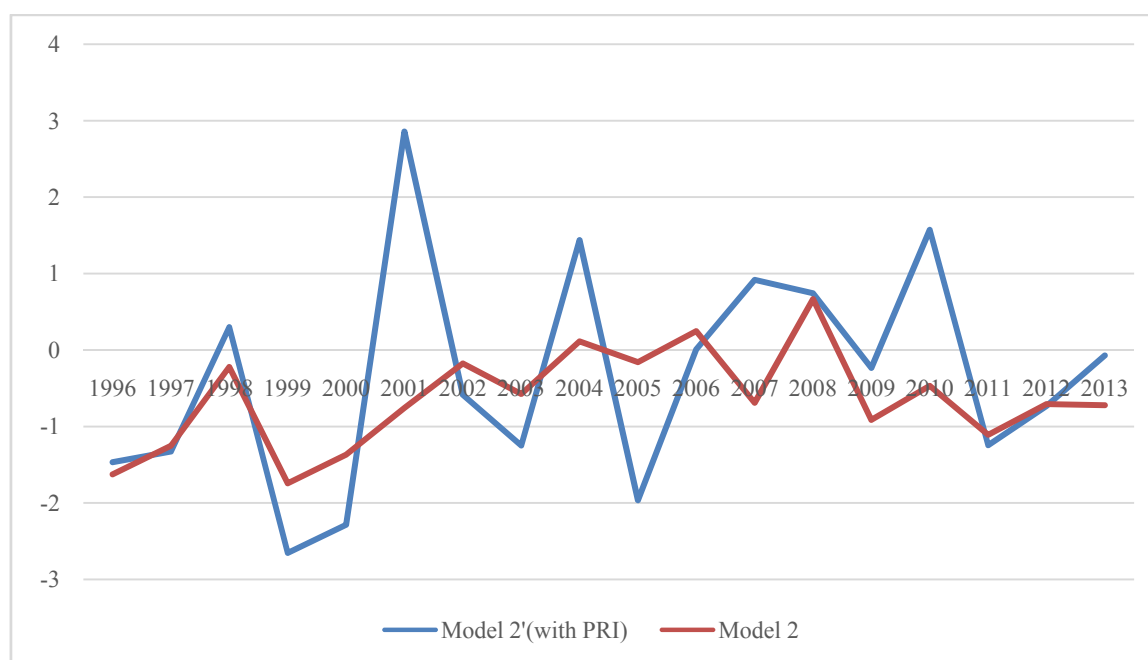


Figure 5 Beta Model Comparison

4. Interpretation of the Results

This section deals with explanation of significance of certain macroeconomic variables. The most significant variables are Forex Reserves, Exchange Rate, Current Account Balance, Unemployment rate and GDP Deflator.

4.1 Explaining Variation in Beta

In the model, higher β implies lower country risk. The level of β does not have as much significance as the change in the level, since we are trying to estimate how macroeconomic indicators lead to a *change* in β .

From Figure 3, it can be seen that the variation in country risk increases significantly, especially in Model 2, after 1991 — the result of liberalization in India. This is to be expected as the Indian economy became more and more integrated with the world economy and hence the increase in the risk.

The years 1998 to 2001 saw increasing β , or a reduction in country risk during the dot-com bubble. Following this period until 2003, there was an increase in country risk when the bubble burst. This is expected in a country like India with the IT industry accounting for a 5.9% of its GDP as of 2009, employing over 2.3 million people. Post the IT bubble, India was back on track and country risk decreased until around 2007, and again increased during the sub-prime crisis.

4.2 Relevance of the Variables Chosen by the Model

4.2.1 Forex Reserves

Official international reserves assets allow a central bank to purchase the domestic currency, which is considered a liability for the central bank. The quantity of foreign exchange reserves can change as a central bank implements monetary policy, but this dynamic should be analyzed generally in the context of the level of capital mobility, the exchange rate regime and other factors. A large percentage of commodities, such as gold and oil, are usually priced in the reserve currency, causing other countries to hold this currency to pay for these goods. Holding currency reserves, therefore, minimizes exchange rate risk, as the purchasing nation will not have to

exchange their currency for the current reserve currency in order to make the purchase.

4.2.2 Exchange Rate

In India, exchange rates are significantly governed by trade activities. The right price of currency in demand-supply terms is essential in judging the stability and growth of any country. The exchange rate is influenced strongly by the behavior and decisions of economic agents and interacts with most of the macroeconomic parameter changes. It is a representation of a country's income distribution, output, price levels and trade terms. Even the slight change in the rate can be interpreted as difference in returns between alternative choices of investments. It is also a representation of optimal resource allocation in the economy to maximize profits in the economy.

India has adopted a flexible exchange rate regime in order to underplay external imbalances arising out of high volatility of capital flows and its requests for immediate macroeconomic adjustments. This is why Governments promote artificial rates to make necessary adjustments. This would also impact many other macroeconomic variables.

4.2.3 Current Account Balance

The current account is an important indicator about an economy's health. A positive current account balance indicates that the nation is a net lender to the rest of the world, while a negative current account balance indicates that it is a net borrower from the rest of the world. A current account surplus increases a nation's net foreign assets by the amount of the surplus, and a current account deficit decreases it by that amount.

4.2.4 Unemployment

Higher the unemployment, lower is the wage rate; which implies that there is a large pool of unemployed workers available in the country. Labor risk, i.e., difficulty in finding qualified workforce at reasonable wage rates, plays a critical role in a country's growth. The labor risk is lower when unemployment is higher. However, this is more effectual than causal. The GDP growth which results in lowering unemployment rate could have been accounted in other factors like FDI inflows and exchange rate.

4.2.4 GDP Deflator

The GDP deflator shows how much a change in the base year's GDP relies upon changes in the price level. Unlike some price indices, the GDP deflator is not based on a fixed basket of goods and services. The basket is allowed to change with people's consumption and investment patterns. Specifically, for the GDP deflator, the "basket" in each year is the set of all goods that were produced domestically, weighted by the market value of the total consumption of each good.

5. Future Scope

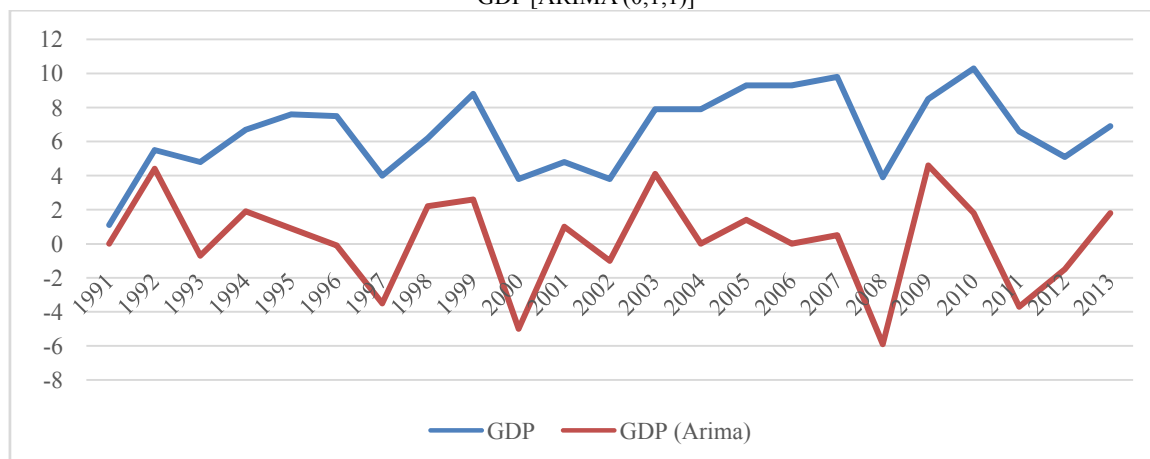
One of the biggest challenges in the analysis was the lack of sufficient data for an OLS regression. The model can be predicted with greater accuracy if monthly data can be obtained for macroeconomic parameters. Our analysis was restricted to 30 data points (1978-2008). The numbers of explanatory variables being more than 10 drastically reduces the degrees of freedom. In addition, the NYSE composite return was used as a proxy for world return R_{World} . Better results may be obtained using an index that is an aggregate of several stock exchanges from different parts of the world. Due to the dynamic nature of the variables and the determinants of country risk themselves; it might make more sense to use coefficients that vary through time (time-varying beta using Kalman Filter). Qualitative parameters like the political risk index may be calculated for the entire time series and included

in the regression to account for non-quantifiable elements causing change in country risk. A regression may be run on a panel of similar economies, rather than on a single country to cancel out common quantitatively unexplained factors in the regression.

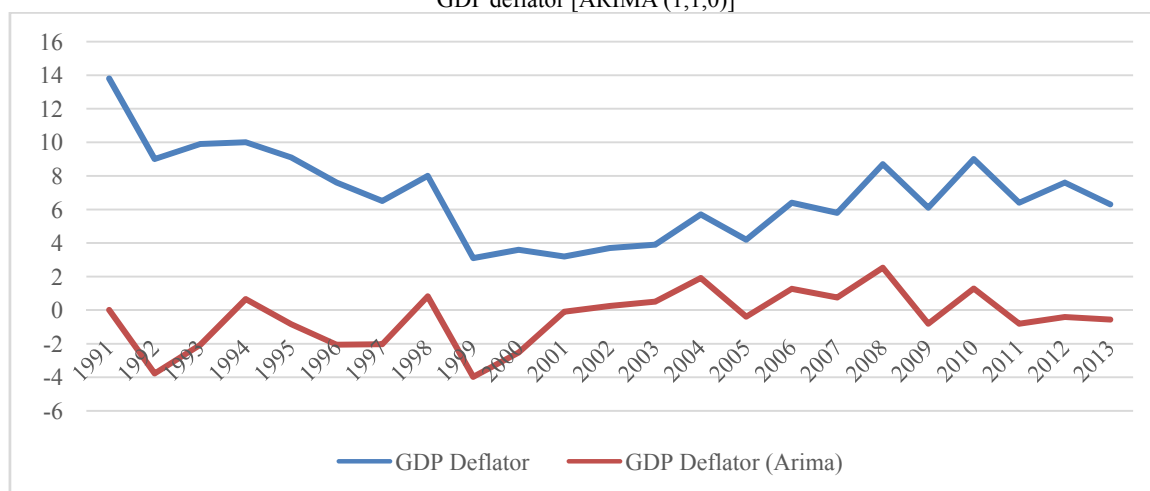
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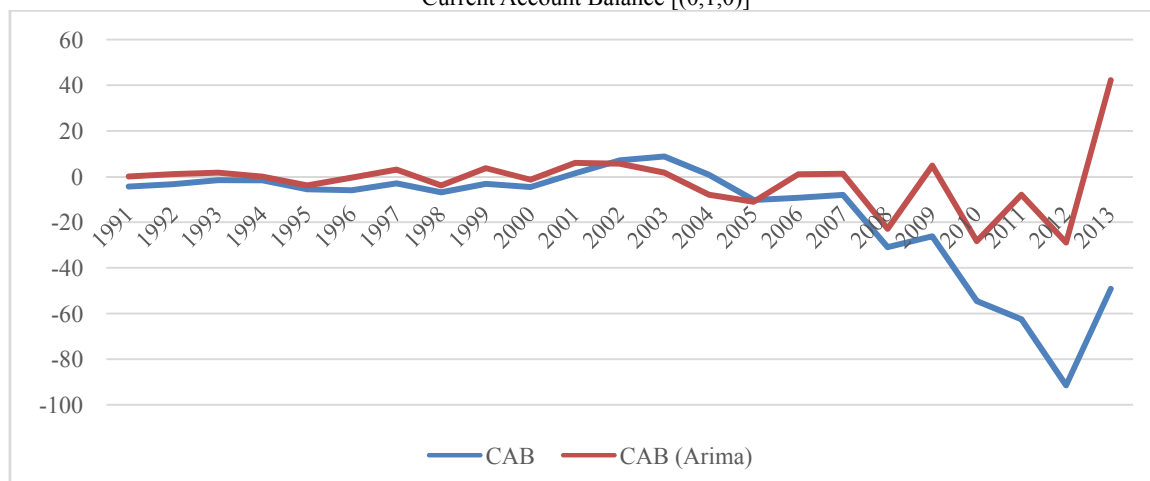
Exhibit 1
GDP [ARIMA (0,1,1)]

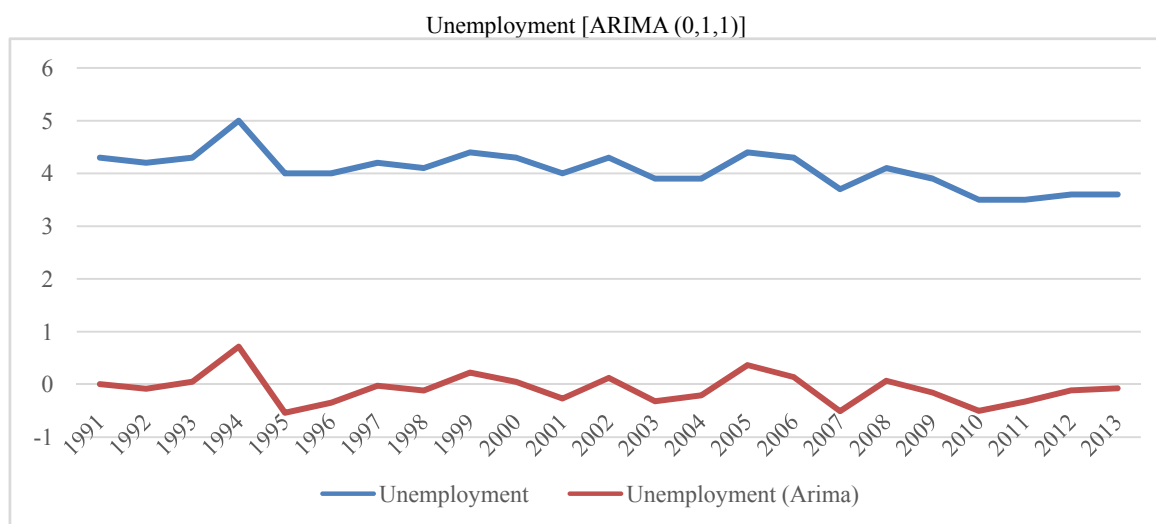
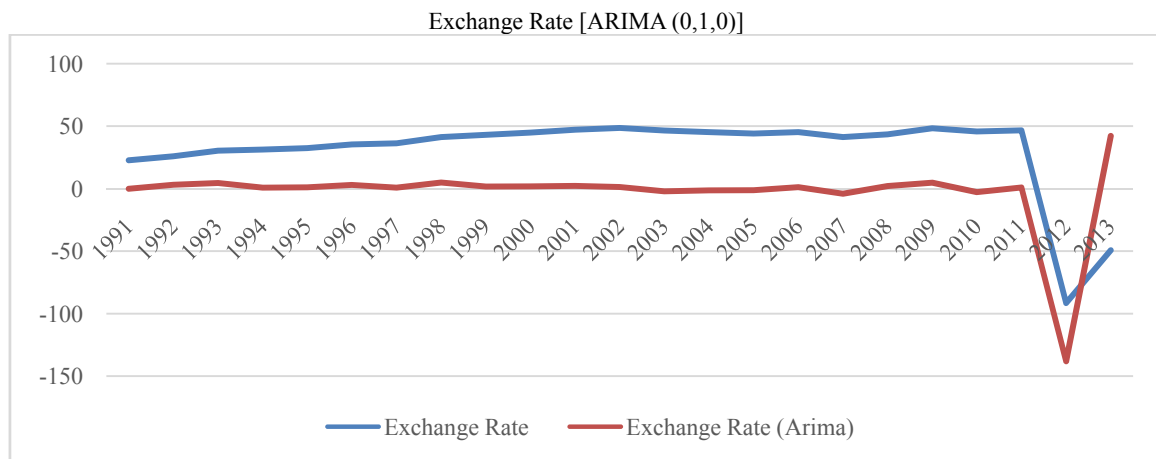
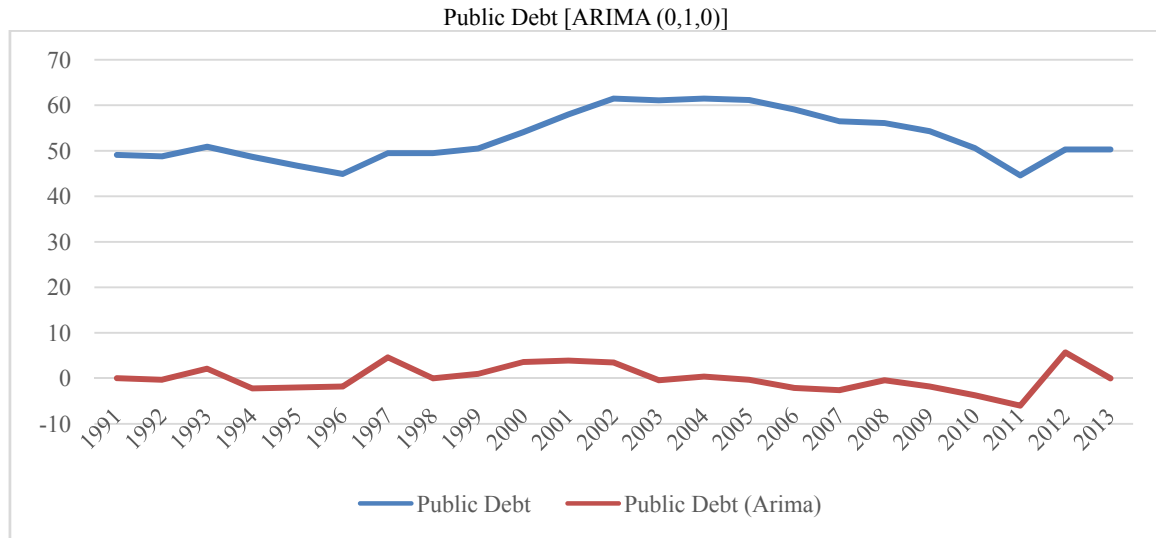


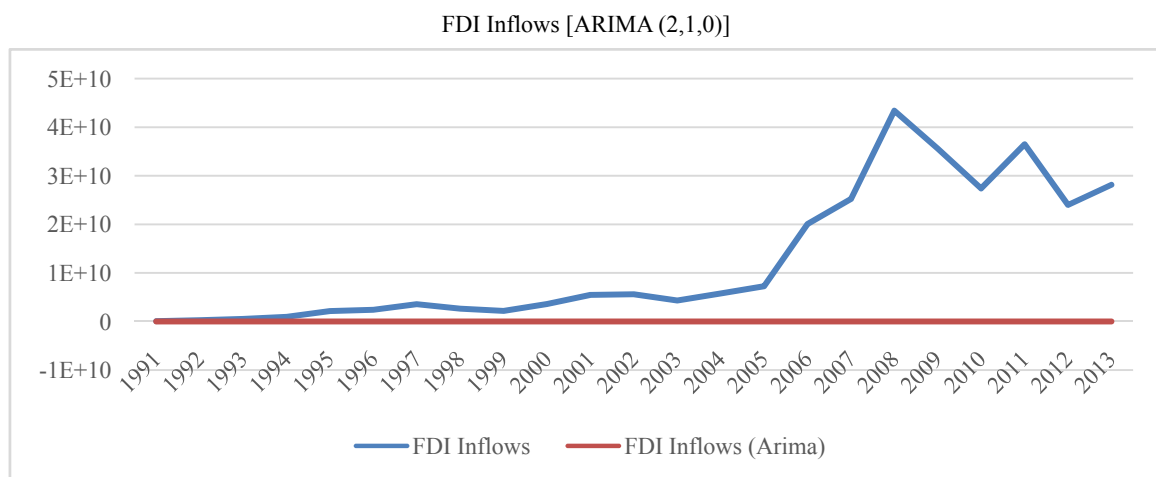
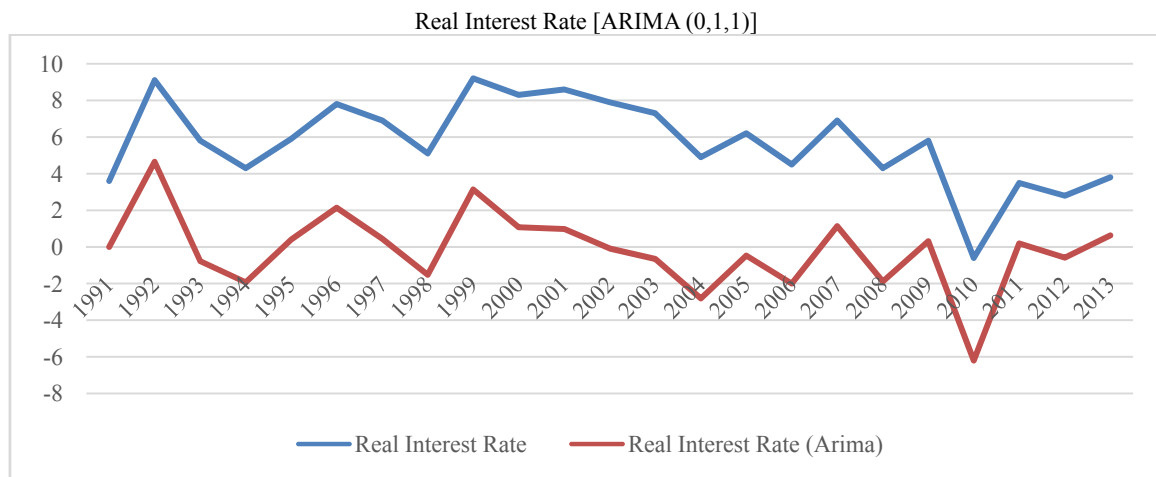
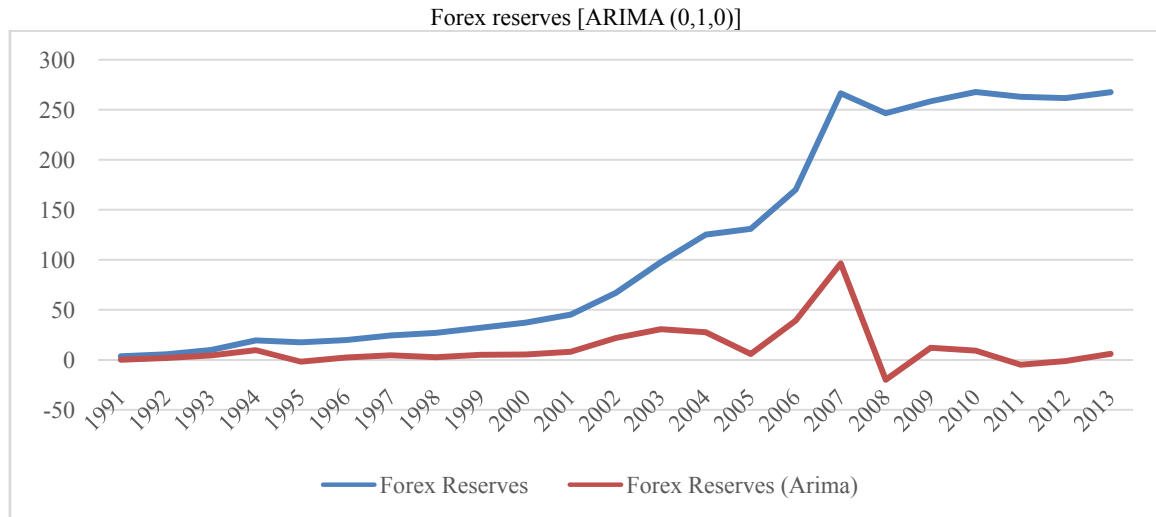
GDP deflator [ARIMA (1,1,0)]



Current Account Balance [(0,1,0)]







Expatriates in Luxembourg: How to Cope with Cultural and Linguistic Specificities?

Ursula Schinzel

(University of Liverpool, UK)

Abstract: The purpose of this research is to investigate how expatriates, their spouses and family coming for work to Luxembourg, can cope with cultural and linguistic specificities. It further investigates, how, with increasing global mobility, the cultural and linguistic characteristics of Luxembourg may influence the tendency of human resource management (HRM) specialists in Luxembourg to utilise social networking technologies (SNT). Two hypotheses are offered. Regarding cultural dimensions and linguistic specificities, the author hypothesizes that the reluctance to use SNT is related to Luxembourg's high score on 'Uncertainty-Avoidance' and that Luxembourgish language is used as an identifier. The originality of this research lies in its usefulness for expatriates, global managers, in their attempt of integration into Luxembourg. The methodology consists first of a profound literature review in global mobility, in HRM and SNT, second: interviews in 41 companies and case studies in 2 companies, and third: questionnaires in 1 company providing 134 filled-in questionnaires, evaluated in SPSS. Findings are: first: Luxembourg has a high level of "Uncertainty-Avoidance", "Long-Term-Orientation" combined with "Happiness", second: HR managers are reluctant to using SNT, keeping practices surprisingly mainly unchanged. Limitations are the comparatively small sample size, the data collected mainly in 2010, questionnaires collected only in one company, and the lack of a strong theory linking culture and happiness. Discussion, Implications, Future Research and References follow.

Key words: global mobility; expatriates; human resource management (HRM); social networking technologies (SNT); cross-cultural management; Hofstede's cultural dimensions

JEL code: F

1. Introduction

The purpose of this study is to explain to expatriates, their spouses and family coming for work to the Grand Duchy of Luxembourg, how to cope with the specific situation in Luxembourg and how to be successful in multilingual and multicultural Luxembourg. With the increase of global mobility, expatriates are trying to cope with the cultural and linguistic specificities in Luxembourg (Schinzel, 2015c), especially in the Human Resource domain. The impact of social networking technologies on human resources practices in Luxembourg are analyzed among the cultural pattern of Luxembourg. Worldwide, digital social networks like LinkedIn, Viadeo, Xing, Facebook and Twitter have revolutionized human resources practices, not so in Luxembourg. Hofstede's

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dimensions of culture are discussed: “Individualism/Collectivism”, “Power Distance”, “Masculinity/Femininity”, “Uncertainty Avoidance”, “Long-Term Orientation/Short-Term Orientation”, “Indulgence versus Restraint” and “Monumentalism”. The hypothesis is discussed that this reluctance to use social networking technologies is founded in Luxembourg’s high score on “Uncertainty Avoidance”. Also the fact, that the Luxembourgish language, a challenge for all expatriates, is used as an identifier in the Grand Duchy, might represent a brake to the extent of the use of social networking technologies. HR practices have a historical background and have developed throughout the years. While standard HRM was for a long time exclusively about HR administration, it is nowadays still about HR administration but also about recruiting and staffing best practices, talent management, and more and more about communication, social networking technologies and e-HRM. The research question is: how can expatriates integrate in Luxembourg, and how do cultural specificities impact the use of social networking technologies and human resource practices in Luxembourg? Interviews, questionnaires and case studies are performed in 41 companies in Luxembourg. Results are presented. Conclusion and references follow.

2. Global Mobility

Globalization of business intends global mobility of people. These people move from one country to another, moving their entire family and homes, taking on responsibilities and encountering challenges never thought of (Brookfield, 2011). Cross-national collaboration (Hinds et al., 2011) is increasing, bringing increasing complexity, fragmentation (Tharenou, 2005) and employees’ careers challenges, given the intensity of global mobility and repeated staff transfers (Shaffer et al., 2012).

Most expat destinations are the United States, China, and the United Kingdom (Brookfield 2011). Despite some recent research, there is a lack in knowledge concerning expatriation, especially in small, so far unexplored countries, such as the Grand Duchy of Luxembourg. This research intends to provide information both for companies and individuals, facilitating the expatriation process into Luxembourg, providing insight into Luxembourg’s special culture and language and its specific Human Resource management practices, especially in the use of social networking technologies.

The existing literature is investing into research of short-term international assignments in multinational companies facing cost issues together with rising staff mobility, including short-term, commuter, rotational, contractual and virtual assignments (Tahvanainen et al., 2005). It is also researching into career choices, challenges and career consequences associated with corporate global employees — flexpatriates, short-term assignees and international business travellers (Shaffer et al., 2012). When staffing global positions, challenges arise through the manageability of multiculturalism (Harvey et al., 2011), trust — affective and competence-based — helps subsidiary acquiescence to headquarters. Intercultural aspects of collaboration across national boundaries are researched by Hinds et al. (2011) using social networks and technology to illustrate how cultural differences generate different behaviour, explaining potential incompatibilities in the global workplace. This shows that the complexity of global staffing in expatriate assignments is mostly underestimated and more strategy is needed for global staffing (Collings et al., 2007; Welch et al., 2007). Work-family conflict, psychological turbulences in international assignments and exacerbating effects of the expat-commitment are more complex than generally estimated (Shaffer et al., 2001).

3. Dimensions of Culture

Geert Hofstede (1980), in his monumental research on culture at IBM, has instigated worldwide research efforts. Culture has been found to have dimensions, the question is not if, but how many. Hofstede initially came up with four dimensions — Individualism versus Collectivism, Uncertainty Avoidance, Power Distance, and Masculinity versus Femininity. He later added a fifth dimension, Long-term versus Short-term Orientation (Bond & Hofstede, 1983), and has just added a sixth dimension — Indulgence versus Restraint (Hofstede, 2001) and together with Minkov (2011) is about to add a seventh dimension — Monumentalism.

Hofstede (1980) defines culture as the “collective programming of the mind which distinguishes the members of one human group from another”. Hofstede defines **Uncertainty avoidance (UAI)** as “the extent to which people feel threatened by uncertainty and ambiguity and try to avoid these situations” (Hofstede, 2001). He defines **Individualism (IDV)** as “people looking after themselves and their immediate family only, versus people belonging to in-groups that look after them in exchange for loyalty” (Hofstede, 2001). The individualism/collectivism cultural dimension has been researched in detail by Triandis (1995) dividing into four dimensions: vertical and horizontal individualism and vertical and horizontal collectivism. **Power Distance (PDI)** is defined as “the extent to which less powerful members of a society accept and expect that power is distributed unequally” (Hofstede, 2001). **Masculinity/Femininity (MAS)** is defined as: “the dominant values in a masculine society are achievement and success; the dominant values in a feminine society are caring for others and quality of life” (Hofstede, 2001). Hofstede (2001) defines **Long-Term Orientation (LTO)** as “the extent to which a society exhibits a pragmatic future-orientated perspective rather than a conventional historic or short-term point of view.” Hofstede defines **Indulgence versus Restraint (IVR)** as: “Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. Restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms” (www.geerthofstede.nl). Minkov defines **Monumentalism (MON)** versus Flexumility as: high pride, immutable identities, values, norms and beliefs (Minkov, 2011).

Today, Hofstede’s work is known, replicated, and also criticized. Some significant culture studies have followed Hofstede. They include culture research projects such as the Chinese Value Survey by Bond et al. (2004), the GLOBE by House et al. (2004), the European Value Survey and the World Value Survey by Inglehart (2008, 2011).

In 2010, together with his son Gert Jan Hofstede and Michael Minkov, Hofstede published “*Cultures and Organizations, Software of the Mind, Third Edition*”. In this edition Hofstede et al. surprised with a sixth dimension of culture titled “indulgence versus restraint”, or “subjective well-being” or “happiness constructs”. The influence of Minkov is not only felt by the addition of a seventh dimension of culture titled “Monumentalism”, but also Hofstede’s advice not to invest further in data collection, but to rather use secondary data, as Minkov (2010) who analyzed Inglehart’s data from www.worldvaluessurvey.org, has done.

This study takes on the second challenge of Hofstede’s criticism, namely, that national boundaries are not the best unit of analysis of studying culture, and uses the example of Luxembourg to demonstrate that language is a better identifier of culture rather than geographical boundaries of nations. It compares data collected in three subsidiaries of one company in Germany, France and Luxembourg, to demonstrate that Luxembourg’s dimensions of culture are not proxies for the average values found by Hofstede in France and Germany, but rather are unique and a result of Luxembourgish, which, along with French and German, is one of the official languages of the

Grand Duchy (Schinzel, 2014, 2015a, 2015b). Hence, the next section delineates background information about Luxembourg's culture and language, followed by a set of hypotheses.

4. Culture and Language

The relationship between "culture and language" has been studied by Kashima and Kashima (1998), testing the use of first- and second-person singular pronouns ("I" and "you") in correlation with Individualism, and by doing so correlating language and culture. The relationship between "cultural background", "language", "geographic region" and "ethnic identity" was researched by Taylora et al. (1973). Lewis (2006) specializes in research on "language programming" in relation with cross cultural leadership. Sherzer (2009) investigates the relationship between grammar and culture, where language conditions thought, perception and world view. Bi-culturalists are able of frame by switching from one language to another (Briley et al., 2005; Hong et al., 2000). Language has been identified as a manipulator of consumers' behaviour (Briley et al., 2005; Hong et al., 2000).

As argued earlier, Luxembourg with its special Luxembourgish language as well as other official languages, and its unique demand for the command of Luxembourgish as a condition for citizenship, provides an appropriate background for testing the role of language as an identifier of culture (Schinzel, 2013). Luxembourg's language is described next, followed by the relevant hypotheses.

5. Luxembourgish Language

Today, 320,000 people are Luxembourgish native speakers. The Luxembourgish language (Spizzo, 1995) has become the discriminating factor to distinguish between those who are able to benefit from Luxembourgish citizenship and those who are not. Luxembourgish possesses the characteristics of a dialect, proven by the fact that there is no translation of the Bible into Luxembourgish. Luxembourgish is a spoken language and does not have a long written tradition (Spizzo, 1995). The language defines the in-group (Briley, 2005) and the out-group. Those who speak Luxembourgish are part of the in-group and those who do not speak the language are part of the out-group. Official documents are in French or in German. Mostly, French is used for bureaucratic issues, and German is used for the religious ceremonies. In order to benefit from all of the advantages of the Luxembourgish nationality one has to be able to speak Luxembourgish. Citizenship is only awarded to people who speak Luxembourgish (Spizzo, 1995). The language, therefore, provides access to the advantages and rights associated with citizenship.

Luxembourgish authorities are an example of long-term orientation; they were able to adapt and react to some of the crises in the steelmaking industry and in the banking system, always with the objective of guaranteeing stability and wealth for the people. It seems as if there was an invisible line of stability and wealth that was guaranteed throughout the centuries. Typical words for the national identity are wealth, privileges, and stability through the maintenance of the attractiveness of the country compared to neighbouring countries, because of its industry, its labor market, and its fiscal benefits, all key for the success of the country. Being part of this system and the feeling it gives is the glue of the country (Spizzo, 1995).

Following the description of Luxembourg's culture, it is argued that Luxembourg's dimensions of culture are not proxies for the average values found by Hofstede in France and Germany, but rather are unique and a result of Luxembourg's language, which is also the official country language since 1984. The following hypotheses are offered:

*Hypothesis 1: Native Luxembourgers scores on the Hofstede's cultural dimensions **PDI**, **UAI**, **IDV**, **MAS**, **LTO**, **IVR**, **MON** are significantly different from the scores of non-native Luxembourgers in Luxembourg.*

6. Human Resource Management

Human Resources Practices have a historical background and have developed throughout the years (Armstrong, 2009; Bratton & Gold, 1999) and with the changing world of work (Kraut & Korman, 1999). Twenty years ago, Human Resources Policies were mostly related to Administration (Mahoney & Deckop, 1986): salary, vacation, absence, work hours, headcount and accounting. In many companies, the accounting department was part of the Human Resources Department. Following this administrative trend, arrived a movement focused on motivation (Kuvaas & Dysvik, 2009). Human Resources became centred on motivation of employees, recruiting, training, evaluation, and recognition. More recently Human Resources (Gilley & Maycunich, 2000) is driven by communication (English et al., 2007; Bada & Madon, 2006), international HR (McLean & McLean, 2001), recruiting in the globalised HR world (Sparrow, 2007) and networking (Tixier, 2004; Slagter, 2009).

Standard HRM is about recruiting and staffing best practices (Ryan et al. 2003), talent management (Tansley et al., 2007), HR administration (Mahoney & Deckop, 1986), communication (Curtis et al., 1989) and e-HR (Lengnick-Hall & Lengnick-Hall, 2006).

Martin and Reddington (2010) are developing a model of e-human resources, focusing on the relationship between HR strategy, e-HR goals and architectures and positive and negative e-HR outcomes in their publication "Theorizing the links between e-HR and strategic HRM: a model, case illustration and reflections." Following Scandula and Williams (2000) it's about "Research methodology in management, and about current practices, trends, and implications for future research." Collins and Clark (2003) make the link between strategic HRM practices and social networks to deduct as a result the increase of performance. Marchington (2008) sees the following topics as main HRM topics: absenteeism, job satisfaction and relational co-ordination, global HRM, job and role design, recruitment, appraisal, the HR business partner model, and the role of HR in international mergers and acquisitions. Kuvaas and Dysvik (2009) write about "Perceived investment in employee development, intrinsic motivation and work performance." Scullion et al. (2007) published "International human resource management in the 21st century: emerging themes and contemporary debates." Tixier (2004) asks "Does the evolution of the human resources practices imply the implementation of an information system?" Slagter (2009) sees "HR practices as predictors for knowledge sharing and innovative behaviour: a focus on age." HRM research also goes into strategic HRM (Mäkelä et al., 2012) and control systems that might prevent managers from unethical behaviour, because it gives them a feeling of being treated fairly (Langevin & Mendoza, 2013).

7. Social Networking Technologies

Following Boese 2009; Cross et al. 2003; Cross and Thomas 2009, Fernandez et al. 2000, HRM standard practices and e-HRM (Martin & Reddington, 2010), digital social networks like LinkedIn, Facebook (Kirkpatrick, 2010) and Twitter have revolutionized human resources practices. Google has changed the way we see our world (Auletta, 2009) and changes our habits (Jarvis, 2009), and the internet does modify our brain (Carr 2010). Some even wish to make the internet stop (Zittrain, 2009). Due to the social technologies, we have to reconsider how we can live and win in a transformed world (Li & Bernoff, 2008), and how we interact in times of Facebook (Stengel, 2010), where the new digital generation grows up with naturally, contrary to the generations before them (Tapscott, 2009).

Historically, Barnes (1954) was the founder of the definition of social networks and his research dates back to 1954. This study was followed by works from Rees (1966) on information networks in labour markets, and by Milgram (1967), who tested the “small world”. De Schweinetz (1932) was the forerunner of economists and sociologists who distinguished between the formal and the informal methods used to find a job. Granovetter (1973, 1985, and 1995) studied the informal methods of finding a job according to him, discovering the “forces of the weak ties”.

In more recent literature, Dodds et al. (2003) conduct an experimental study of search in global social networks. Fernandez et al. (2000) study the networks at a phone centre. Godin (2008) studies people’s behaviour in “tribes”.

Sammartino McPherson (2009) describes Tim Berners-Lee (2000) who imagined a world wide web, encouraging social interactions, giving people without huge technical competences and knowledge the possibility to publish online content, free of charge, unlimited in space and time and the opportunity to interact with others.

The research paper from Hasgall and Shoham (2007) is “Digital social network and the complex organizational systems”, where social networks in organizations are viewed as a shared knowledge system backed by management.

An interesting article is to be found from Jones (2010) about how to use Twitter, Facebook and LinkedIn in recruitment. Boese (2009) writes about standard HRM practices and social network analysis.

In the view of Shirky (2009 and 2010) people go through different stages of “Gin, Television and Social Surplus”. Firstly, they meet in pubs for a drink and later they spent their free time watching TV. Next, they reach the phase where they like to share and communicate, to produce and not only to consume.

Following Tapscott (2009) the reluctance for the use of new technologies lies within the generation gap. He describes the “Net-Generation” as learners who are rethinking talent and management, and who are in networks and in families.

Hypothesis 2: HR specialists in Luxembourg are reluctant to utilize social networking technologies due to their specific cultural identity. As a result, the practical techniques used related to recruiting, integration, communication, training, talent management and the evaluation of employees remain largely unchanged.

This research engages in debates resulting from reviews of HRM practices in general, based on relevant literature, ERP (Lengnick-Hall and Lengnick-Hall, 2006) and theory in comparison to practices currently in use. This research will show that Luxembourg is different from other markets, confirming Greenwald and Kahn’s (2005) “All strategy is local”. Luxembourg has a specific work environment that is not in-line with the theories of the globalised world (IPSE 2010, AmCham, 2010).

Several questions arise:

- Why have human resources specialists in Luxembourg been reluctant to utilise social networking technologies? How do they do HRM? How to make them use new technologies? What causes this reluctance? Specific cultural facts, differences in nationalities, or age, or gender or other facts (Fisher & Howell, 2004; Martin & Reddington, 2010)?
- Which standard HRM practices (Kuvaas & Dysvik, 2009; Marchington, 2008) in recruiting, evaluation, information gathering, training, outplacement were typically used in the past by Luxembourg companies and are still used?
- When used, which social networking technologies do companies prefer and how does their use impact performance (Collins & Clark, 2003)? A look into the past and into the future of Networking in Luxembourg.

- Is the local use of these social networking technologies (SNT) affected by cultural specificities (McLean & Campbell, 2003; Scullion et al., 2007) or age (Tapscot, 2009)? What is the impact of the specific cultural identity and language (Jameson, 2007)?

8. Methods

(1) Collecting primary data via Participant Observation, following Saunders et al. (2009), Strauss and Corbin (2008), Taylor and Bogdan (1998), Wilson (2010): participation at seminars, conferences, meetings, dinners, breakfasts, networking events, organized by different organizations and companies.

(2) Collecting primary data via Face-to-Face Interviews and, in total 41 companies. Additionally 2 case study were performed in 2 companies.

(3) Collecting primary data via Hofstede's original questionnaires in one company, replicating Hofstede's study on cultural dimensions, as Hofstede holds only estimates for Luxembourg.

9. Results

The results show first, that hypothesis 1 is confirmed. Native Luxembourg's scores on cultural dimensions differ from non-native Luxembourgers, as shown in Table 1. The table shows a comparison of Luxembourg (all nationalities) with Luxembourg with Luxembourgish nationality (Lux. Nat.) and Hofstede's estimates on Luxembourg. Lux.Nat. scores are: PDI: 29, UAI: 95, IDV: 34, MAS: 54, LTO: 65, IVR: 55, MON: 24, which differs from Luxembourg including all nationalities, and Hofstede's estimates.

Table 1 Comparison Luxembourg — Luxembourg with Luxembourgish Nationality — Hofstede's Estimates on Luxembourg (on a scale from 1-100, 1 being the lowest and 100 the highest score)

| | Luxembourg (all nationalities) | Luxembourg with Luxembourgish nationality (Lux.Nat.) | Hofstede's estimates on Luxembourg |
|-----|--------------------------------|--|------------------------------------|
| PDI | 36 | 29 | 40 |
| UAI | 97 | 95 | 70 |
| IDV | 51.5 | 34 | 60 |
| MAS | 47 | 54 | 50 |
| LTO | 69 | 65 | 64 |
| IVR | 53.5 | 55 | 56 |
| MON | 10 | 24 | - |

Additionally, the below correlation matrix shows that Luxembourgers are characterized for being long term oriented, they indulge in life, they are uncertainty avoidant, and they are happy.

The second result is, that hypothesis 2 is confirmed. Due to their cultural identity, HR Managers are reluctant to use digital social networks in Luxembourg. HR practices have not notably changed over the years. In Luxembourg, the recruitment sector has not been revolutionized by Facebook, LinkedIn, and Twitter, contrary to the rest of the world. This might be a result of the high "Uncertainty Avoidance Index" following Hofstede (Schinzel, 2014, 2015a, 2015b).

The following questions are answered as follows (multiple answers were possible):

- Which means are mainly used in recruiting? Was answered: Advertisement in newspapers (25) and spontaneous applications (23). Digital social networks (8) are far the less used mean in recruiting.

Table 2 Correlations among All Variables (N = 134)

| | PDI | UAI | IDV | MAS | LTO | IVR | MON | HAPPY | GENDER | AGE | EDUCATION |
|-----------|---------|--------|---------|---------|---------|---------|----------|-------|--------|----------|-----------|
| PDI | - | | | | | | | | | | |
| UAI | -0.021 | - | | | | | | | | | |
| IDV | 0.135 | -0.011 | - | | | | | | | | |
| MAS | 0.206* | -0.060 | 0.517** | - | | | | | | | |
| LTO | 0.138 | 0.059 | 0.030 | 0.000 | - | | | | | | |
| IVR | 0.031 | 0.043 | 0.318** | 0.272** | 0.042 | - | | | | | |
| MON | 0.068 | 0.023 | 0.245** | 0.129 | -0.089 | 0.244** | - | | | | |
| HAPPY | 0.038 | 0.160 | 0.045 | 0.014 | 0.268** | 0.293** | 0.001 | - | | | |
| GENDER | -0.030 | 0.073 | -0.041 | -0.012 | 0.004 | -0.029 | -0.105 | 0.029 | - | | |
| AGE | -0.117 | 0.031 | -0.059 | 0.022 | -0.076 | 0.108 | -0.312** | 0.040 | -0.128 | - | |
| EDUCATION | 0.037 | -0.155 | 0.106 | 0.094 | 0.119 | 0.112 | 0.060 | 0.082 | 0.120 | -0.025 | - |
| RANK | 0.230** | 0.210* | -0.001 | 0.016 | 0.080 | -0.043 | 0.090 | 0.006 | 0.162 | -0.490** | -0.084 |

Note: * $p < .05$; ** $p < .001$

- What means do companies use, when they use digital social networks? Was answered: They mainly use LinkedIn (20), followed by Facebook (12), Newsletter (10), and Xing (9).

- During the recruitment process how do companies gather information about the candidate? Was answered: They mainly use the CV (36) and the interview with the candidate (35). Friends (6) and digital social networks (7) are the least used means.

- After the recruitment process, how do companies gather information about an employee? Was answered: They mainly do this through discussion with the employee (35) and the annual performance evaluation (21). Friends (2) and digital social networks (3) are the least used means.

- Which internet pages are accessible in a company? Was answered: Most companies have restricted their internet access (21), compared to unlimited access (20).

- How is networking mainly done in Luxembourg? was answered: Networking is done through private contacts (37), followed by meetings, events, seminars (33), clubs and associations (25) and leisure (19).

Further, several questions were answered concerning advantages and disadvantages of SNT, cultural differences and specificities. Answers are shown by grouping them into broad categories.

Table 3 Advantages of SNT

| | |
|---|----|
| Categories that summarise advantages of SNT grouped in broad categories | |
| Find/share a lot of information, diversified, you are looking for, besides the CV, about the candidate, i.e., if he/she has a social life, to confirm my first impression | 22 |
| Easy and quick accessibility and transparency | 19 |
| No answer to this question, because we don't use them | 15 |
| Keep in touch/Connecting with (many) people (with whom you have lost contact) | 11 |
| Building and growing a network (private and business) – the world got smaller | 11 |
| None | 7 |
| Promote me and my business, advertisement | 6 |
| Contact potential candidates/Get info about the candidate before the interview, contact passive candidates and candidates far away | 4 |
| Global: Meet people from other countries and learn about other cultures | 4 |
| Flexible and future oriented, a huge impact | 4 |
| Is for free/No cost | 3 |

Table 4 Disadvantages of SNT

| | |
|---|----|
| Categories that summarise disadvantages of SNT grouped in broad categories | |
| No answer to this question, because we don't use them | 22 |
| Lack of Reliability: A lot of lies, untrue data, lack of trust, not accurate info, incompetent people, no fair judgement of the potential candidate | 18 |
| Lack of confidentiality, indiscretion, mistrust | 16 |
| Possibility of abuse, not secure, stalking, hacking, cloning of information, especially for young people, limited data protection | 12 |
| Lack of Privacy | 9 |
| Time consuming, They create more work for the HR staff: more time investment, less outcome | 7 |
| There are no disadvantages | 6 |
| No control. Too fast, too much information, unlimited access to information | 6 |
| Low quality /Quality Risks | 6 |
| Superficial (we are friends, yes, and then?) | 4 |
| Direct contact with people gets difficult, you lose direct discussion with people, get wrong impression, bad opinion because of posts on internet | 3 |
| I prefer my traditional ways of communication | 1 |
| That I cannot use them | 1 |

Table 5 Cultural Differences

| | |
|--|----|
| Categories that summarize differences in culture while using SNT grouped in broad categories | |
| There is no Luxembourgish digital social network | 22 |
| Xing is used by Germans, Viadeo by French, LinkedIn mostly professional/international | 7 |
| No differences, because they are international | 7 |
| Yes, Cultural differences, multiculturalism | 5 |
| I know there are, but I cannot say what exactly / I don't know | 5 |
| Most people go simply to Facebook, across cultures | 4 |
| Yes, difference in language, use of language and related to the language of the e-recruitment | 4 |
| Yes, quick changing environment | 1 |
| Yes, better overview on job offers | 1 |
| The French have their French culture, the Germans have their German culture, and then there is the company culture | 1 |
| No answer to this question, I don't know, we don't use them | 32 |

Table 6 Cultural Specificities

| | |
|---|----|
| Categories that summarise specificities in the use of SNT in the multicultural environment of Luxembourg grouped in broad categories | |
| Use of various languages and various networks, because of the various languages, multi-culturalism also in SNT | 7 |
| The Germans use the German networks, the French and Belgian the French e-recruitment, they are the most used. Like the neighbouring countries. There are NO specificities | 6 |
| There are no SNT that reflect Luxembourg's specificities in culture, because multi-lingual and influenced by neighbouring countries. Living and working in Luxembourg is like living and working all over the world because the whole world is here! It's our daily life. | 6 |
| I know there are, but I cannot say what exactly / I don't know | 5 |
| The traditional way of doing HR remains unchanged, Luxembourg is reluctant to new technologies, the traditional way is personal contacts. Luxembourg first observes the other countries' experiences before implementing something | 4 |
| In Luxembourg SNT are used to announce events in Luxembourg, to making new friends and private and business contacts through these events, to connect easily with people in Luxembourg, a small country | 3 |
| Many global players, international profiles, highly experienced, multi-cultural people, Luxembourg is colourful | 2 |
| Lack of accuracy, lack of standards, nerving | 2 |
| The Luxembourgish language (and the fact that I don't speak it) | 1 |
| No answer to this question because we don't use them | 32 |

This closes the chapter on data analysis. Discussion, implications, limitations and future research follow.

10. Discussion, Implications, Limitations and Future Research

The purpose of this study was to explain, in this world of increasing global mobility, the cultural and linguistic characteristics of Luxembourg that may influence the tendency of human resources specialists in Luxembourg to utilize social networking technologies such as LinkedIn, Viadeo, Xing, Facebook and Twitter.

It provides an answer for expatriates to the question: “How to cope with cultural and linguistic specificities and how to be successful in multicultural, international Luxembourg?” Cultural identity, intercultural communication, language and international business are discussed by Jameson (2007). How to do business with social networks in international trade (Rauch, 2001)?

Increasingly expatriates are influenced by global mobility (Tahvanainen et al., 2005), more collaboration across borders (Hinds et al., 2011), strategy in global staffing (Collings et al., 2007), complexity, struggling the work-family balance (Shaffer et al., 2001), trust building (Harvey et al., 2011), career consequences (Shaffer et al. 2012). This research is interesting for expatriates, their spouses and family coming for work to the Grand Duchy of Luxembourg, trying to cope with the cultural and linguistic specificities. Tharenou (2005) names the main reasons why people accept expat work: (1) money, (2) professional development and (3) challenging content; and why people won’t accept expat work: (1) family commitments and (2) disruption.

This study is the result of the link between Hofstede’s cultural dimensions and standard HRM practices, such as e-HRM in Luxembourg.

HR Managers will be made aware of the usefulness of digital social networks and may potentially implement them into their current HRM Practices (Guler & Guillen, 2010).

The aim is to analyze Luxembourg and its way of doing business while continuing to evolve with changing technologies. The questions discussed go deep into the analysis of everyday business life, cultural identity, language and international trade in Luxembourg (Horner, 2009; Kingsley, 2009; Davis, 2009). One must genuinely accept and understand the meaning of “Mir wëlle bleiwe wat mir sinn”. If one does not make an effort to integrate into Luxembourg’s specific business culture, success in Luxembourg may never be possible (Background Notes, 2006; Neefs & Laures, 2010).

By employing a unique sample that includes respondents who speak French, German and Luxembourgish in France, Germany and Luxembourg this study has managed to corroborate the notion that language is a good identifier of culture (Schinzel, 2013). While scores in this study for French and Germans in France and Germany resemble to a great extent Hofstede’s scores for these two countries, and while scores in this study resemble Hofstede’s estimates for Luxembourgers who speak any official language of the Grand Duchy, Hofstede’s estimates varied to a great extent from this study scores for Luxembourgers who command Luxembourgish as their mother tongue. This is a unique testimony for the relationships between language and culture, while controlling for country.

Some proven relationships between culture, represented by such dimensions as Long Term Orientation, and high level of Indulgence, and Happiness, have been corroborated in this study. It is self-evident that two measures, who measure similar concepts, namely, Indulgence on a national level and Happiness on the individual’s level should be related to each other. The Grand Duchy’s political, social and economic stability allows people to plan for the long term, thereby providing support for people’s need for security and life predictability. It is possible that

this is the key for the relationship between Long Term Orientation and Happiness in Luxembourg found in this study. To validate this argument it is worth citing Hofstede himself: “At 70 Luxembourg has a high score on uncertainty avoidance which means that as a nation they are quiet reluctant to test unknown territories. Security is a key word in Luxembourg: there is not one activity which is not depending on some sort of security control from authorities; from banker’s money to safety exits in a restaurant. It makes the live in Luxembourg very safe, but some would argue a bit boring. New ideas, new methods, new management techniques must first be proven to work in other countries in order to be accepted in Luxembourg. Historically more “farmers” than “traders” the inhabitants kept that good old “common sense” made of cautiousness which has proven to be profitable for a country who managed not to be at war since the Napoleonic time! (<http://geert-hofstede.com/luxemburg.html>). Since this is the first time that such efforts are being made to find the relationship between happiness and culture, those results should be taken cautiously.

Not surprisingly, Indulgence was found to be significantly related to Individualism and Masculinity, two concepts that are part of the definition of Indulgence. The significant relationship between Indulgence and Monumentalism, and the significant negative relationship between Monumentalism and Age, may indicate that younger people tend to be more individualistic, monumental and, therefore, happy. This hypothesis could only be corroborated by enlarging the sample size, a fact which would allow conducting more sophisticated statistics than mere correlation.

As a single researcher, the author cannot compete with large databases such as Inglehart or the Globe. The comparatively small sample size of the interviews, the data collected via questionnaire in only one company, and the lack of a strong theory to link culture and happiness, could all have biased the results and their interpretations. Yet, it is likely that scores that were found to be significant in a small sample are likely to be made even more significant in a larger sample. Also the fact that data were mainly collected in 2010, and things might have evolved in the meantime, might have influenced the results.

Despite these limitations, this research could be used by expat-Managers, HR professionals, recruiters, head-hunters and HR directors in Luxembourg and wish to collaborate globally with Luxembourg, who would like to consider evolving technologies and their potential use in Luxembourg’s business environment considering its cultural identity (Jameson, 2007).

Future studies could focus on strategies and challenges of global human resource management, concentrating on the following challenges: degree of standardization of HR, foreign industrial relations, labour laws, time zones, cross cultural differences and cultural sensitivity, leadership development, communication, expatriates’ adjustments, inflexibility and work-family balance (Ananthram & Chan, 2013). It would be interesting to focus on the relationship between language and culture and empirically validate it for other languages.

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Evaluating Distribution Centers via a Maximizing Set and Minimizing Set Based Fuzzy MCDM Approach

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Abstract: The evaluation and selection of a distribution center has been an important issue for a company to upgrade its distribution efficiency and operation performance in order to fulfill the diverse demands of consumer. This paper suggests a maximizing set and minimizing based fuzzy MCDM model to resolve this problem, where ratings of alternatives versus qualitative criteria and the importance weights of all the criteria are assessed in linguistic values represented by fuzzy numbers. Ranking formulae and membership functions for the final fuzzy evaluation values can be clearly developed for better executing the decision making. A numerical is used to demonstrate the feasibility of the proposed approach.

Key words: fuzzy MCDM; distribution center; location selection; ranking; maximizing set and minimizing set.

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1. Introduction

Manufacturers, customers and suppliers are important members of a supply chain. To some extent, the success of a manufactory depends on its ability to link these members seamlessly. In the real logistics systems, it often requires some distribution centers to connect manufactories and their customers for the improvement of product flow (Yang et al., 2007). Distribution center (DC) is viewed as the competence that links an enterprise with its customers and suppliers. A distribution center is usually supplied by the sources such as manufacturing factories, vendors, etc., and in turn it supplies the consumers or demand locations. In order to reduce transportation cost, enforce operation efficiency and logistics performance, evaluating and selecting a DC location has become one of the most important decision issues for distribution industries (Chen, 2001).

Evaluating a DC location, many conflicting criteria must be considered. These criteria can be classified into two categories: (1) objective — these criteria can be evaluated quantitatively, e.g., investment cost, and (2) subjective — these criteria have qualitative definitions, e.g., expansion possibility, closeness to demand market, etc. In addition, these criteria may have different importance (Bowersox & Closs, 1996; Stevenson, 2014; Sule, 1994; Tompkins et al., 2010). Numerous precision-based methods for location selection problems have been investigated (Aikens, 1985; Alumur & Kara, 2007; Cheng et al., 2005; Colebrook & Sicillia, 2007; Cram et al.,

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2006; Hodder & Dincer, 1986; Malczewski, 2006; Pavić & Babić, 1991; Rietveld & Ouwersloot, 1992; Rodriguez et al., 2006; Şener et al., 2006). A review can be seen in Yuzkaya et al. (2008). All the above methods are developed based on the concept of accurate measure and crisp evaluation, i.e., the measuring values must be numerical and exact. In 2004, Pérez et al. pointed out “Location problems concern a wide set of fields where it is usually assumed that exact data are known. However, in real applications, the location of facility considered can be full of linguistic vagueness, that can be appropriately modeled using networks with fuzzy values.” Moreover, the values for the qualitative criteria are often imprecisely defined for the decision-makers. Obviously, the precision-based methods are not adequate to resolve the DC location selection problem. To resolve the above problems, a fuzzy multiple criteria decision making (MCDM) method is suggested.

Fuzzy set theory, initially proposed by Zadeh (1965), has been extensively applied to objectively reflect the ambiguities in human judgment and effectively resolve the uncertainties in the available information in an ill-defined multiple criteria decision making environment. Numerous approaches have been proposed to solve fuzzy MCDM problems. A review and comparison of many of these methods can be found in Carlsson and Fullér (1996), Chen and Hwang (1992), Kuo (2011) and Triantaphyllou and Lin (1996). Some recent applications on locations evaluation and selection can be found in (Anagnostopoulos et al., 2008; Chou, 2007; Güzel & Erdal, 2015; Wang et al., 2010), and some other recent works in fuzzy MCDM can be found in (Akdag et al., 2014; Chu & Varma, 2012; Chung et al., 2015; Ghorbani et al., 2013). Despite the merits, most of the above papers cannot present membership functions for the final fuzzy evaluation values, nor can they clearly develop defuzzification formulae from the membership functions of the final fuzzy evaluation values, which limit the applicability of the fuzzy MCDM methods available. To resolve these limitations, this work suggests a maximizing set and minimizing set based fuzzy MCDM approach for the evaluation and selection of distribution centers. Many fuzzy number ranking methods have been studied. A comparison of many of these ranking methods can be found in Wang and Lee (2008). Some recent works can be found in (Abbasbandy & Hajjari, 2009; Asady, 2010; Ezzati et al., 2012; Farhadinia, 2009; Hari Ganesh and Jayakumar, 2014; Rao & Shankar, 2013; Sharma, 2015). However, in spite of the merits, some of these methods are computational complex and difficult to implement and none of them can satisfactorily rank fuzzy numbers in all situations and cases. Herein, the ranking approach of maximizing set and minimizing set (Chen, 1985) is applied for defuzzification due to its simplicity of implementation. Furthermore, defuzzification procedure can be clearly presented and formulae can be developed. Finally, a numerical example demonstrates the computational process of the proposed model.

The rest of this work is organized as follows. Section 2 briefly introduces fuzzy set theory. Section 3 introduces the suggested model. Meanwhile, an example is presented in Section 4 to demonstrate the feasibility of the proposed model and conclusions are made in Section 5.

2. Fuzzy Set Theory

2.1 Fuzzy Sets

$A = \{(x, f_A(x)) | x \in U\}$, where U is the universe of discourse, x is an element in U , A is a fuzzy set in U , $f_A(x)$ is the membership function of A at x (Kaufmann and Gupta, 1991). The large $f_A(x)$, the stronger the grade of membership for x in A .

2.2 Fuzzy Numbers

A real fuzzy number A is described as any fuzzy subset of the real line R with membership function f_A which

possesses the following properties (Dubois & Prade, 1978):

- (a) f_A is a continuous mapping from R to $[0,1]$;
- (b) $f_A(x) = 0, \forall x \in (-\infty, a]$;
- (c) f_A is strictly increasing on $[a, b]$;
- (d) $f_A(x) = 1, x \in [b, c]$;
- (e) f_A is strictly decreasing on $[c, d]$;
- (f) $f_A(x) = 0, \forall x \in [d, \infty)$;

where $a \leq b \leq c \leq d$, A can be denoted as $[a, b, c, d]$. The membership function f_A of the fuzzy number A can also be expressed as:

$$f_A(x) = \begin{cases} f_A^L(x), & a \leq x \leq b \\ 1, & b \leq x \leq c \\ f_A^R(x), & c \leq x \leq d \\ 0, & \text{otherwise} \end{cases} \quad (1)$$

where $f_A^L(x)$ and $f_A^R(x)$ are left and right membership functions of A , respectively (Kaufmann & Gupta, 1991). A fuzzy triangular number can be denoted as (a, b, c) .

2.3 α -cuts

The α -cuts of fuzzy number A can be defined as $A^\alpha = \{x \mid f_A(x) \geq \alpha\}$, $\alpha \in [0,1]$, where A^α is a non-empty bounded closed interval contained in R and can be denoted by $A^\alpha = [A_l^\alpha, A_u^\alpha]$, where A_l^α and A_u^α are its lower and upper bounds, respectively (Kaufmann & Gupta, 1991).

2.4 Arithmetic Operations on Fuzzy Numbers

Given fuzzy numbers A and B , $A, B \in R^+$, the α -cuts of A and B are $A^\alpha = [A_l^\alpha, A_u^\alpha]$ and $B^\alpha = [B_l^\alpha, B_u^\alpha]$, respectively. By the interval arithmetic, some main operations of A and B can be expressed as follows (Kaufmann & Gupta, 1991):

$$(A \oplus B)^\alpha = [A_l^\alpha + B_l^\alpha, A_u^\alpha + B_u^\alpha] \quad (2)$$

$$(A \ominus B)^\alpha = [A_l^\alpha - B_u^\alpha, A_u^\alpha - B_l^\alpha] \quad (3)$$

$$(A \otimes B)^\alpha = [A_l^\alpha \cdot B_l^\alpha, A_u^\alpha \cdot B_u^\alpha] \quad (4)$$

$$(A \oslash B)^\alpha = \left[\frac{A_l^\alpha}{B_u^\alpha}, \frac{A_u^\alpha}{B_l^\alpha} \right] \quad (5)$$

$$(A \otimes r)^\alpha = [A_l^\alpha \cdot r, A_u^\alpha \cdot r], r \in R^+ \quad (6)$$

2.5 Linguistic Values

A linguistic variable is a variable whose values are expressed in linguistic terms. Linguistic variable is a very helpful concept for dealing with situations which are too complex or not well-defined to be reasonably described by traditional quantitative expressions (Zadeh, 1975). For example, “importance” is a linguistic variable whose values include UI (unimportant), LI (less important), I (important), MI (more important) and VI (very important). These linguistic values can be further represented by triangular fuzzy numbers such as UI = (0.0, 0.0, 0.25), LI = (0.0, 0.25, 0.5), I = (0.25, 0.5, 0.75), MI = (0.50, 0.75, 1.00) and VI = (0.75, 1.00, 1.00).

3. Model Development

Suppose decision makers D_t , $t = 1, 2, \dots, l$, are responsible for evaluating alternatives A_i , $i = 1, 2, \dots, m$, under selected criteria, C_j , $j = 1, 2, \dots, n$. Criteria are categorized into three groups such as benefit qualitative criteria C_j , $j = 1, \dots, g$, benefit quantitative criteria C_j , $j = g+1, \dots, h$, and cost quantitative criteria C_j , $j = h+1, \dots, n$. The proposed model is developed as the following steps.

3.1 Aggregate Ratings of Alternatives versus Qualitative Criteria

Assume $x_{ijt} = (a_{ijt}, b_{ijt}, c_{ijt})$, $i = 1, \dots, m$, $j = 1, \dots, g$, $t = 1, \dots, l$,

$$x_{ij} = \frac{1}{l} \otimes (x_{ij1} \oplus x_{ij2} \oplus \dots \oplus x_{ijl}) \quad (7)$$

Where $a_{ij} = \frac{1}{l} \sum_{t=1}^l a_{ijt}$, $b_{ij} = \frac{1}{l} \sum_{t=1}^l b_{ijt}$, $c_{ij} = \frac{1}{l} \sum_{t=1}^l c_{ijt}$. x_{ijt} denotes ratings assigned by each decision maker for each alternative versus each qualitative criterion. x_{ij} denotes averaged rating of each alternative versus each qualitative criterion.

3.2 Normalize Values of Alternatives versus Quantitative Criteria

Herein, Chen's (2001) method is applied to normalize values of alternatives versus quantitative criteria, including benefit and cost, in order to make data dimensionless for calculation rationale. Benefit quantitative data has the characteristics: the larger the better; whereas cost quantitative data has the characteristics: the smaller the better. Suppose $y_{ij} = (o_{ij}, p_{ij}, q_{ij})$ denotes evaluation value of alternative i versus benefit quantitative criteria j , $j = g+1, \dots, h$, as well as cost quantitative criteria j , $j = h+1, \dots, n$. And x_{ij} denotes the normalized value of y_{ij}

$$x_{ij} = \left(\frac{o_{ij}}{q_{ij}^*}, \frac{p_{ij}}{q_{ij}^*}, \frac{q_{ij}}{q_{ij}^*} \right), \quad q_{ij}^* = \max q_{ij}, \quad j \in B, \quad (8)$$

$$x_{ij} = \left(\frac{o_{ij}^*}{q_{ij}}, \frac{o_{ij}^*}{p_{ij}}, \frac{o_{ij}^*}{o_{ij}} \right), \quad o_{ij}^* = \min o_{ij}, \quad j \in C. \quad (9)$$

For calculation convenience, assume $x_{ij} = (a_{ij}, b_{ij}, c_{ij})$, $j = g+1, \dots, n$.

3.3 Average Importance Weights

Assume $w_{jt} = (d_{jt}, e_{jt}, f_{jt})$, $w_{jt} \in R^+$, $j = 1, \dots, n$, $t = 1, \dots, l$,

$$w_j = \frac{1}{l} \otimes (w_{j1} \oplus w_{j2} \oplus \dots \oplus w_{jl}) \quad (10)$$

Where $d_j = \frac{1}{l} \sum_{t=1}^l d_{jt}$, $e_j = \frac{1}{l} \sum_{t=1}^l e_{jt}$, $f_j = \frac{1}{l} \sum_{t=1}^l f_{jt}$. w_{jt} represents the weight assigned by each decision

maker for each criterion and w_j represents the average importance weight of each criterion.

3.4 Develop Membership Functions

The membership function of the final fuzzy evaluation value, G_i , $i = 1, \dots, n$, of each alternative can be developed as equation (11). In equation (11), the first two parts are additive weighted ratings under benefit criteria. The third part is under cost criteria but given a negative sign. Therefore, the larger the G_i value, the better performance A_i will have.

$$G_i = \sum_{j=1}^g w_j \otimes x_{ij} + \sum_{j=g+1}^h w_j \otimes x_{ij} - \sum_{j=h+1}^n w_j \otimes x_{ij}, \quad (11)$$

The membership functions are developed as:

$$G_i^\alpha = \sum_{j=1}^g w_j^\alpha \otimes x_{ij}^\alpha + \sum_{j=g+1}^h w_j^\alpha \otimes x_{ij}^\alpha - \sum_{j=h+1}^n w_j^\alpha \otimes x_{ij}^\alpha, \quad (12)$$

$$w_j^\alpha = [(e_j - d_j)\alpha + d_j, (e_j - f_j)\alpha + f_j], \quad (13)$$

$$x_{ij}^\alpha = [(b_{ij} - a_{ij})\alpha + a_{ij}, (b_{ij} - c_{ij})\alpha + c_{ij}]. \quad (14)$$

From equations (13) and (14), we can develop equation (15) as follows:

$$\begin{aligned} \sum w_j^\alpha \otimes x_{ij}^\alpha = & \left[\sum (e_j - d_j)(b_{ij} - a_{ij})\alpha^2 + \sum (a_{ij}(e_j - d_j) + d_j(b_{ij} - a_{ij}))\alpha + \sum a_{ij}d_j, \right. \\ & \left. \sum (b_{ij} - c_{ij})(e_j - f_j)\alpha^2 + \sum (c_{ij}(e_j - f_j) + f_j(b_{ij} - c_{ij}))\alpha + \sum c_{ij}f_j \right] \end{aligned} \quad (15)$$

By applying Eq. (15) to Eq. (12), three equations are developed:

$$\begin{aligned} \sum_{j=1}^g w_j^\alpha \otimes x_{ij}^\alpha = & \left[\sum_{j=1}^g (e_j - d_j)(b_{ij} - a_{ij})\alpha^2 + \sum_{j=1}^g (a_{ij}(e_j - d_j) + d_j(b_{ij} - a_{ij}))\alpha + \sum_{j=1}^g a_{ij}d_j, \right. \\ & \left. \sum_{j=1}^g (b_{ij} - c_{ij})(e_j - f_j)\alpha^2 + \sum_{j=1}^g (c_{ij}(e_j - f_j) + f_j(b_{ij} - c_{ij}))\alpha + \sum_{j=1}^g c_{ij}f_j \right]. \end{aligned} \quad (16)$$

$$\begin{aligned} \sum_{j=g+1}^h w_j^\alpha \otimes x_{ij}^\alpha = & \left[\sum_{j=g+1}^h (e_j - d_j)(b_{ij} - a_{ij})\alpha^2 + \sum_{j=g+1}^h (a_{ij}(e_j - d_j) + d_j(b_{ij} - a_{ij}))\alpha + \sum_{j=g+1}^h a_{ij}d_j, \right. \\ & \left. \sum_{j=g+1}^h (b_{ij} - c_{ij})(e_j - f_j)\alpha^2 + \sum_{j=g+1}^h (c_{ij}(e_j - f_j) + f_j(b_{ij} - c_{ij}))\alpha + \sum_{j=g+1}^h c_{ij}f_j \right]. \end{aligned} \quad (17)$$

$$\begin{aligned} \sum_{j=h+1}^n w_j^\alpha \otimes x_{ij}^\alpha = & \left[\sum_{j=h+1}^n (e_j - d_j)(b_{ij} - a_{ij})\alpha^2 + \sum_{j=h+1}^n (a_{ij}(e_j - d_j) + d_j(b_{ij} - a_{ij}))\alpha + \sum_{j=h+1}^n a_{ij}d_j, \right. \\ & \left. \sum_{j=h+1}^n (b_{ij} - c_{ij})(e_j - f_j)\alpha^2 + \sum_{j=h+1}^n (c_{ij}(e_j - f_j) + f_j(b_{ij} - c_{ij}))\alpha + \sum_{j=h+1}^n c_{ij}f_j \right]. \end{aligned} \quad (18)$$

Assume:

$$A_{i1} = \sum_{j=1}^g (e_j - d_j)(b_{ij} - a_{ij}), A_{i2} = \sum_{j=g+1}^h (e_j - d_j)(b_{ij} - a_{ij}), A_{i3} = \sum_{j=h+1}^n (e_j - d_j)(b_{ij} - a_{ij}),$$

$$B_{i1} = \sum_{j=1}^g [a_{ij}(e_j - d_j) + d_j(b_{ij} - a_{ij})], B_{i2} = \sum_{j=g+1}^h [a_{ij}(e_j - d_j) + d_j(b_{ij} - a_{ij})],$$

$$B_{i3} = \sum_{j=h+1}^n [a_{ij}(e_j - d_j) + d_j(b_{ij} - a_{ij})], C_{i1} = \sum_{j=1}^g (b_{ij} - c_{ij})(e_j - f_j),$$

$$C_{i2} = \sum_{j=g+1}^h (b_{ij} - c_{ij})(e_j - f_j), C_{i3} = \sum_{j=h+1}^n (b_{ij} - c_{ij})(e_j - f_j),$$

$$D_{i1} = \sum_{j=1}^g [c_{ij}(e_j - f_j) + f_j(b_{ij} - c_{ij})], D_{i2} = \sum_{j=g+1}^h [c_{ij}(e_j - f_j) + f_j(b_{ij} - c_{ij})],$$

$$D_{i3} = \sum_{j=h+1}^n [c_{ij}(e_j - f_j) + f_j(b_{ij} - c_{ij})], O_{i1} = \sum_{j=1}^g a_{ij}d_j, O_{i2} = \sum_{j=g+1}^h a_{ij}d_j, O_{i3} = \sum_{j=h+1}^n a_{ij}d_j,$$

$$P_{i1} = \sum_{j=1}^g b_{ij}e_j, P_{i2} = \sum_{j=g+1}^h b_{ij}e_j, P_{i3} = \sum_{j=h+1}^n b_{ij}e_j, Q_{i1} = \sum_{j=1}^g c_{ij}f_j, Q_{i2} = \sum_{j=g+1}^h c_{ij}f_j, Q_{i3} = \sum_{j=h+1}^n c_{ij}f_j.$$

By applying the above assumption, equations (16)-(18) can be arranged as:

$$\sum_{j=1}^g w_j^\alpha \otimes x_{ij}^\alpha = [A_{i1}\alpha^2 + B_{i1}\alpha + O_{i1}, C_{i1}\alpha^2 + D_{i1}\alpha + Q_{i1}], \quad (19)$$

$$\sum_{j=g+1}^h w_j^\alpha \otimes x_{ij}^\alpha = [A_{i2}\alpha^2 + B_{i2}\alpha + O_{i2}, C_{i2}\alpha^2 + D_{i2}\alpha + Q_{i2}], \quad (20)$$

$$\sum_{j=h+1}^n w_j^\alpha \otimes x_{ij}^\alpha = [A_{i3}\alpha^2 + B_{i3}\alpha + O_{i3}, C_{i3}\alpha^2 + D_{i3}\alpha + Q_{i3}]. \quad (21)$$

Applying equations (19)-(21) to equation (12) to produce equation (22):

$$G_i^\alpha = [(A_{i1} + A_{i2} - C_{i3})\alpha^2 + (B_{i1} + B_{i2} - D_{i3})\alpha + (O_{i1} + O_{i2} - Q_{i3}), \quad (22)$$

$$(C_{i1} + C_{i2} - A_{i3})\alpha^2 + (D_{i1} + D_{i2} - B_{i3})\alpha + (Q_{i1} + Q_{i2} - O_{i3})].$$

The right and left membership functions of G_i can be obtained as shown in equation (23) and equation (24) as follows:

$$\alpha = f_{G_i}^L(x)$$

$$= \frac{-(B_{i1} + B_{i2} - D_{i3}) + [(B_{i1} + B_{i2} - D_{i3})^2 + 4(A_{i1} + A_{i2} - C_{i3})(x - (O_{i1} + O_{i2} - Q_{i3}))]}{2(A_{i1} + A_{i2} - C_{i3})} \quad (23)$$

If $O_{i1} + O_{i2} - Q_{i3} \leq x \leq P_{i1} + P_{i2} - P_{i3}$;

$$\alpha = f_{G_i}^R(x)$$

$$= \frac{-(D_{i1} + D_{i2} - B_{i3}) + [(D_{i1} + D_{i2} - B_{i3})^2 + 4(C_{i1} + C_{i2} - A_{i3})(x - (Q_{i1} + Q_{i2} - O_{i3}))]}{2(C_{i1} + C_{i2} - A_{i3})} \quad (24)$$

If $P_{i1} + P_{i2} - P_{i3} \leq x \leq Q_{i1} + Q_{i2} - O_{i3}$.

3.5 Rank Fuzzy Numbers

In this research, Chen's maximizing set and minimizing set (Chen, 1985) is applied to rank all the final fuzzy evaluation values. This method is one of the most commonly used approaches of ranking fuzzy numbers in fuzzy decision making.

The maximizing set M is defined as:

$$f_M(x) = \begin{cases} \left(\frac{x_{R_i} - x_{\min}}{x_{\max} - x_{\min}}\right)^k, & x_{\min} \leq x_{R_i} \leq x_{\max}, \\ 0, & \text{otherwise.} \end{cases} \quad (25)$$

The minimizing set N is defined as:

$$f_N(x) = \begin{cases} \left(\frac{x_{L_i} - x_{\max}}{x_{\min} - x_{\max}}\right)^k, & x_{\min} \leq x_{L_i} \leq x_{\max}, \\ 0, & \text{otherwise,} \end{cases} \quad (26)$$

where $x_{\min} = \inf_x S$, $x_{\max} = \sup_x S$, $S = \cup_{i=1}^n S_i$, $S_i = \{x | f_{A_i}(x) > 0\}$, usually k is set to 1.

The right utility of A_i is defined as:

$$U_M(A_i) = \sup_x (f_M(x) \wedge f_{A_i}(x)), i = 1 \sim n. \quad (27)$$

The left utility of A_i is defined as:

$$U_N(A_i) = \sup_x (f_N(x) \wedge f_{A_i}(x)), i = 1 \sim n. \quad (28)$$

The total utility of A_i is defined as:

$$U_T(A_i) = \frac{1}{2}(U_M(A_i) + 1 - U_N(A_i)), i = 1 \sim n. \quad (29)$$

The total utility $U_T(A_i)$ is applied to rank fuzzy numbers. The larger the $U_T(A_i)$, the larger the fuzzy number A_i . Applying equations (25)-(29) to equations (23)-(24), the total utility of fuzzy number G_i can be obtained as:

$$\begin{aligned} U_T(G_i) &= \frac{1}{2}(U_M(G_i) + 1 - U_N(G_i)), i = 1 \sim n, \\ &= \frac{1}{2} \left[\frac{-(D_{i1} + D_{i2} - B_{i3}) - [(D_{i1} + D_{i2} - B_{i3})^2 + 4(C_{i1} + C_{i2} - A_{i3})(x_{R_i} - (Q_{i1} + Q_{i2} - O_{i3}))]^2}{2(C_{i1} + C_{i2} - A_{i3})} \right. \\ &\quad \left. + 1 - \frac{-(B_{i1} + B_{i2} - D_{i3}) + [(B_{i1} + B_{i2} - D_{i3})^2 + 4(A_{i1} + A_{i2} - C_{i3})(x_{L_i} - (O_{i1} + O_{i2} - Q_{i3}))]^2}{2(A_{i1} + A_{i2} - C_{i3})} \right]. \end{aligned} \quad (30)$$

where

$$\begin{aligned} x_{R_i} &= -(2(C_{i1} + C_{i2} - A_{i3})x_{\min} + (x_{\min} - x_{\max})(D_{i1} + D_{i2} - B_{i3} + x_{\min} - x_{\max})) \\ &\quad - (x_{\max} - x_{\min})[(D_{i1} + D_{i2} - B_{i3} + x_{\min} - x_{\max})^2 \\ &\quad + 4(C_{i1} + C_{i2} - A_{i3})(x_{\min} - Q_{i1} - Q_{i2} + O_{i3})]^2 / 2(C_{i1} + C_{i2} - A_{i3}). \end{aligned} \quad (31)$$

$$\begin{aligned} x_{L_i} &= -(2(A_{i1} + A_{i2} - C_{i3})x_{\max} + (x_{\max} - x_{\min})(B_{i1} + B_{i2} - D_{i3} + x_{\max} - x_{\min})) \\ &\quad + (x_{\min} - x_{\max})[(B_{i1} + B_{i2} - D_{i3} + x_{\max} - x_{\min})^2 \\ &\quad + 4(A_{i1} + A_{i2} - C_{i3})(x_{\max} - O_{i1} - O_{i2} + Q_{i3})]^2 / 2(A_{i1} + A_{i2} - C_{i3}). \end{aligned} \quad (32)$$

In Eq. (31), formula for x_{R_i} is developed as follows:

$$\begin{aligned} \Rightarrow \frac{x_{R_i} - x_{\min}}{x_{\max} - x_{\min}} &= \frac{-(D_{i1} + D_{i2} - B_{i3})}{2(C_{i1} + C_{i2} - A_{i3})} \\ &\quad - \frac{[(D_{i1} + D_{i2} - B_{i3})^2 + 4(C_{i1} + C_{i2} - A_{i3})(x_{R_i} - (Q_{i1} + Q_{i2} - O_{i3}))]^2}{2(C_{i1} + C_{i2} - A_{i3})}. \\ \Rightarrow -(D_{i1} + D_{i2} - B_{i3}) &- [(D_{i1} + D_{i2} - B_{i3})^2 + 4(C_{i1} + C_{i2} - A_{i3})(x_{R_i} - (Q_{i1} + Q_{i2} - O_{i3}))]^2 \\ &= \frac{x_{R_i} - x_{\min}}{x_{\max} - x_{\min}} 2(C_{i1} + C_{i2} - A_{i3}). \end{aligned}$$

$$\Rightarrow x_{R_i} = \frac{-2(C_{i1} + C_{i2} - A_{i3})x_{\min} + (x_{\min} - x_{\max})(D_{i1} + D_{i2} - B_{i3} + x_{\min} - x_{\max})}{2(C_{i1} + C_{i2} - A_{i3})} - \left[\frac{(x_{\max} - x_{\min})(D_{i1} + D_{i2} - B_{i3} + x_{\min} - x_{\max})^2}{2(C_{i1} + C_{i2} - A_{i3})} + \frac{(x_{\max} - x_{\min})4(C_{i1} + C_{i2} - A_{i3})(x_{\min} - Q_{i1} - Q_{i2} + O_{i3})}{2(C_{i1} + C_{i2} - A_{i3})} \right]^{\frac{1}{2}}.$$

In equation (32), formula for x_{L_i} is developed as follows:

$$\frac{x_{L_i} - x_{\max}}{x_{\min} - x_{\max}} = \frac{-(B_{i1} + B_{i2} - D_{i3})}{2(A_{i1} + A_{i2} - C_{i3})} + \frac{[(B_{i1} + B_{i2} - D_{i3})^2 + 4(A_{i1} + A_{i2} - C_{i3})(x_{L_i} - (O_{i1} + O_{i2} - Q_{i3}))]^2}{2(A_{i1} + A_{i2} - C_{i3})}.$$

$$\Rightarrow -(B_{i1} + B_{i2} - D_{i3}) + [(B_{i1} + B_{i2} - D_{i3})^2 + 4(A_{i1} + A_{i2} - C_{i3})(x_{L_i} - (O_{i1} + O_{i2} - Q_{i3}))]^2 = \frac{x_{L_i} - x_{\max}}{x_{\min} - x_{\max}} 2(A_{i1} + A_{i2} - C_{i3}).$$

$$\Rightarrow x_{L_i} = \frac{-2(A_{i1} + A_{i2} - C_{i3})x_{\max} + (x_{\max} - x_{\min})(B_{i1} + B_{i2} - D_{i3} + x_{\max} - x_{\min})}{2(A_{i1} + A_{i2} - C_{i3})} + \left[\frac{(x_{\min} - x_{\max})(B_{i1} + B_{i2} - D_{i3} + x_{\max} - x_{\min})^2}{2A_{i1} + A_{i2} - C_{i3}} + \frac{(x_{\min} - x_{\max})4(A_{i1} + A_{i2} - C_{i3})(x_{\max} - O_{i1} - O_{i2} + Q_{i3})}{2A_{i1} + A_{i2} - C_{i3}} \right]^{\frac{1}{2}}.$$

4. Numerical Example

Assume that a logistics company is looking for a suitable city to set up a new distribution center. Three decision makers, D_1 , D_2 and D_3 of this company are responsible for the evaluation of three distribution center candidates, A_1 , A_2 and A_3 . Four benefit qualitative criteria such as expandability (C_1), convenience to acquiring materials (C_2), closeness to market (C_3), human resources (C_4); one benefit quantitative criterion such as area size (C_5); and one cost quantitative criterion such as investment cost (C_6) are chosen for evaluating the distribution centers.

Further assume that linguistic values and their corresponding triangular fuzzy numbers shown in Table 1 are used to evaluate each distribution center candidate versus each qualitative criterion. Ratings of distribution center candidates versus qualitative criteria are given by decision makers as shown in Table 2. Through equation (7), averaged ratings of distribution center candidates versus qualitative criteria can be obtained as also displayed in Table 2. In addition, suppose values of distribution center candidates versus quantitative criteria are present as in Table 3. According to equations (8) and (9), values of alternatives under benefit and cost quantitative criteria can be normalized as shown in Table 4. The linguistic values and its corresponding fuzzy numbers, shown in section 2.5, are used by decision makers to evaluate the importance of each criterion as displayed in Table 5. The average

weight of each criterion can be obtained using equation (10) and can also be shown in Table 5.

Apply equations (11)-(22) and $g = 4$, $h = 5$, $n = 6$ to the numerical example to produce A_{i1}, A_{i2}, A_{i3} , $B_{i1}, B_{i2}, B_{i3}, C_{i1}, C_{i2}, C_{i3}, D_{i1}, D_{i2}, D_{i3}, O_{i1}, O_{i2}, O_{i3}, P_{i1}, P_{i2}, P_{i3}, Q_{i1}, Q_{i2}, Q_{i3}$ for each candidate as displayed in Table 6. The calculation values for $A_{i1}+A_{i2}-C_{i3}$, $B_{i1}+B_{i2}-D_{i3}$, $O_{i1}+O_{i2}-Q_{i3}$, $C_{i1}+C_{i2}-A_{i3}$, $D_{i1}+D_{i2}-B_{i3}$, $P_{i1}+P_{i2}-P_{i3}$, $Q_{i1}+Q_{i2}-Q_{i3}$ are shown in Table 7.

Table 1 Linguistic Values and Fuzzy Numbers for Ratings

| | |
|--|------------------|
| Very low(VL) /Very difficult(VD) /Very far(VF) | (0.00,0.15,0.30) |
| Low(L)/Difficult(D)/Far(F) | (0.15,0.30,0.50) |
| Medium(M) | (0.30,0.50,0.70) |
| High(H)/Easy(E)/Close(C) | (0.50,0.70,0.85) |
| Very high(VH)/Very easy(VE)/Very close(VC) | (0.70,0.85,1.00) |

Table 2 Ratings of Distribution Center Candidates versus Qualitative Criteria

| Candidates | Criteria | D_1 | D_2 | D_3 | Averaged Ratings |
|------------|----------|-------|-------|-------|------------------|
| A_1 | C_1 | VH | H | VH | (0.63,0.80,0.95) |
| | C_2 | VE | E | M | (0.50,0.68,0.85) |
| | C_3 | C | VC | VC | (0.63,0.80,0.95) |
| | C_4 | M | H | H | (0.43,0.63,0.80) |
| A_2 | C_1 | VH | VH | H | (0.63,0.80,0.95) |
| | C_2 | M | M | E | (0.37,0.57,0.75) |
| | C_3 | C | C | VC | (0.57,0.75,0.90) |
| | C_4 | VH | VH | VH | (0.70,0.85,1.00) |
| A_3 | C_1 | L | L | H | (0.27,0.43,0.62) |
| | C_2 | VE | E | VE | (0.63,0.80,0.95) |
| | C_3 | M | M | C | (0.37,0.57,0.75) |
| | C_4 | L | M | H | (0.32,0.50,0.68) |

Table 3 Values of Distribution Center Candidates versus Quantitative Criteria

| Criteria | Distribution Center Candidates | | | Units |
|----------|--------------------------------|-------|-------|---------|
| | A_1 | A_2 | A_3 | |
| C_5 | 100 | 80 | 90 | hectare |
| C_6 | 2 | 5 | 10 | million |

Table 4 Normalization of Quantitative Criteria

| Criteria | Distribution Center Candidates | | |
|----------|--------------------------------|-------|-------|
| | A_1 | A_2 | A_3 |
| C_5 | 1 | 0.8 | 0.9 |
| C_6 | 1 | 0.4 | 0.2 |

Table 5 Averaged Weight of Each Criterion

| | D_1 | D_2 | D_3 | Averaged weights |
|-------|-------|-------|-------|------------------|
| C_1 | MI | VI | IM | (0.50,0.75,0.92) |
| C_2 | IM | MI | LI | (0.25,0.50,0.75) |
| C_3 | LI | LI | VI | (0.25,0.53,0.67) |
| C_4 | UI | IM | VI | (0.33,0.50,0.67) |
| C_5 | MI | VI | IM | (0.50,0.75,0.92) |
| C_6 | VI | VI | VI | (0.75,1.00,1.00) |

Through equations (23) and (24), the left, $f_{G_i}^L(x)$, and right, $f_{G_i}^R(x)$, membership functions of the final fuzzy evaluation value, G_i , $i = 1, \dots, n$, of each distribution center candidate can be obtained and displayed in Table 8.

Table 6 Values for $A_{i1}, A_{i2}, A_{i3}, B_{i1}, B_{i2}, B_{i3}, C_{i1}, C_{i2}, C_{i3}, D_{i1}, D_{i2}, D_{i3}, O_{i1}, O_{i2}, O_{i3}, P_{i1}, P_{i2}, P_{i3}, Q_{i1}, Q_{i2}, Q_{i3}$

| | A_1 | A_2 | A_3 |
|----------|-------|-------|-------|
| A_{i1} | 0.17 | 0.17 | 0.17 |
| A_{i2} | 0.00 | 0.00 | 0.00 |
| A_{i3} | 0.00 | 0.00 | 0.00 |
| B_{i1} | 0.77 | 0.76 | 0.62 |
| B_{i2} | 0.25 | 0.16 | 0.23 |
| B_{i3} | 0.25 | 0.10 | 0.05 |
| C_{i1} | 0.12 | 0.12 | 0.12 |
| C_{i2} | 0.00 | 0.00 | 0.00 |
| C_{i3} | 0.00 | 0.00 | 0.00 |
| D_{i1} | -1.11 | -1.11 | -1.08 |
| D_{i2} | -0.17 | -0.13 | -0.15 |
| D_{i3} | 0.00 | 0.00 | 0.00 |
| O_{i1} | 0.74 | 0.78 | 0.49 |
| O_{i2} | 0.50 | 0.40 | 0.45 |
| O_{i3} | 0.75 | 0.30 | 0.15 |
| P_{i1} | 1.68 | 1.71 | 1.28 |
| P_{i2} | 0.75 | 0.60 | 0.68 |
| P_{i3} | 1.00 | 0.40 | 0.20 |
| Q_{i1} | 2.68 | 2.70 | 2.23 |
| Q_{i2} | 0.92 | 0.73 | 0.83 |
| Q_{i3} | 1.00 | 0.40 | 0.20 |

Table 7 Values for $A_{i1}+A_{i2}-C_{i3}, B_{i1}+B_{i2}-D_{i3}, O_{i1}+O_{i2}-Q_{i3}, C_{i1}+C_{i2}-A_{i3}, D_{i1}+D_{i2}-B_{i3}, P_{i1}+P_{i2}-P_{i3}, Q_{i1}+Q_{i2}-O_{i3}$

| | A_1 | A_2 | A_3 |
|------------------------|-------|-------|-------|
| $A_{i1}+A_{i2}-C_{i3}$ | 0.17 | 0.17 | 0.17 |
| $B_{i1}+B_{i2}-D_{i3}$ | 1.02 | 0.92 | 0.84 |
| $O_{i1}+O_{i2}-Q_{i3}$ | 0.24 | 0.78 | 0.74 |
| $C_{i1}+C_{i2}-A_{i3}$ | 0.12 | 0.12 | 0.12 |
| $D_{i1}+D_{i2}-B_{i3}$ | -1.53 | -1.34 | -1.28 |
| $P_{i1}+P_{i2}-P_{i3}$ | 1.43 | 1.91 | 1.75 |
| $Q_{i1}+Q_{i2}-O_{i3}$ | 2.84 | 3.13 | 2.91 |

Table 8 Left and Right Membership Functions of G_i

| | |
|----------------|--|
| $f_{G_1}^L(x)$ | $\frac{-1.02 + \left[(1.02)^2 + 4(0.17)(x - 0.24) \right]^{\frac{1}{2}}}{2 \times 0.17}, 0.24 \leq x \leq 1.43$ |
| $f_{G_1}^R(x)$ | $\frac{1.53 + \left[(-1.53)^2 + 4(0.12)(x - 2.84) \right]^{\frac{1}{2}}}{2 \times 0.12}, 1.43 \leq x \leq 2.84$ |
| $f_{G_2}^L(x)$ | $\frac{-0.92 + \left[(0.92)^2 + 4(0.17)(x - 0.78) \right]^{\frac{1}{2}}}{2 \times 0.17}, 0.78 \leq x \leq 1.91$ |
| $f_{G_2}^R(x)$ | $\frac{1.34 + \left[(-1.34)^2 + 4(0.12)(x - 3.13) \right]^{\frac{1}{2}}}{2 \times 0.12}, 1.91 \leq x \leq 3.13$ |
| $f_{G_3}^L(x)$ | $\frac{-0.84 + \left[(0.84)^2 + 4(0.17)(x - 0.74) \right]^{\frac{1}{2}}}{2 \times 0.17}, 0.74 \leq x \leq 1.75$ |
| $f_{G_3}^R(x)$ | $\frac{1.28 + \left[(-1.28)^2 + 4(0.12)(x - 2.91) \right]^{\frac{1}{2}}}{2 \times 0.12}, 1.75 \leq x \leq 2.91$ |

By equations (25)-(32), the total utilities, $U_T(G_i)$, x_{R_i} and x_{L_i} can be obtained and shown in Table 9.

Table 9 Total Utilities $U_T(G_i)$, x_{R_i} and x_{L_i}

| Alternatives | G_1 | G_2 | G_3 |
|--------------|-------|-------|-------|
| x_{R_i} | 1.97 | 2.26 | 2.12 |
| x_{L_i} | 1.39 | 1.40 | 1.33 |
| $U_T(G_i)$ | 0.315 | 0.551 | 0.517 |

Then according to values in Table 9, candidate A_2 has the largest total utility, $U_T(G_2) = 0.551$. Therefore A_2 becomes the most suitable distribution center candidate for this company.

5. Conclusions

A fuzzy MCDM model is proposed for the evaluation and selection of the locations of distribution centers, where ratings of alternatives versus qualitative criteria and the importance weights of all the criteria are assessed in linguistic values represented by fuzzy numbers. Membership functions of the final fuzzy evaluation values can be developed through interval arithmetic and α -cuts of fuzzy numbers. Chen's maximizing set and minimizing set is applied to defuzzify the final fuzzy evaluation values in order to rank all the alternatives. Ranking formulae are clearly developed for better executing the decision making. Finally a numerical has demonstrated the computational procedure of the proposed approach.

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The Impact of Sexual Orientation on Consumers' Tipping Behavior

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Abstract: Despite the importance of tipping as a source of income for service providers and its pervasiveness in the daily lives of consumers, research to date has not explored whether and how tipping (or voluntary contributions in general) might be impacted by individual differences such as sexual orientation characteristics. We address this gap in the literature by forwarding a framework for understanding the relationship between sexual orientation and tipping, and empirically exploring it in two studies. In study 1, customer orders were observed to gauge the tipping behavior of heterosexual and homosexual individuals in the context of bar service. Study 2 consisted of interviews with service employees varying in sexual orientation, age, gender, and professional experience. Themes from the interviews and results from the field study indicate that straight (versus gay) individuals tend to tip more when the service provider is female, and the impact of sexual orientation on tipping is contingent on the gender and physical attractiveness of the interacting parties. A theme of relationship building was uncovered, suggesting that beyond bill size, tips are dependent on the development of one-on-one relations between the consumer and service provider.

Key words: tipping; sexual orientation; marketing; services

JEL code: M31

1. Introduction

Face-to-face public relations are particularly important in service settings, where successful interactions between frontline employees and clients are not only conducive to benefits for the firm's reputation (Dean, 2015; Mburu, 2014), but also quite directly affecting the earnings of service providers in the form of tips. Regarding factors that can play a role in tip revenues and service performance, some are under the direct control of the employee (e.g., the amount of time and attention devoted to the customer interaction, the level of enthusiasm displayed), while others are not within the employee's purview (e.g., the time of day/night when the business interaction occurs, the gender or sexual orientation of the interacting parties). The latter factors might not be controllable per se; however, they can still be managed in the public relations process in a way that maximizes organizational goals, employee objectives and customer satisfaction. The present research explores this process and offers actionable guidelines for business policy in contexts involving tipping behavior.

The study of tipping is at the cross-roads of marketing, management, human resources, economics, and social psychology, and has received research attention in all of these areas (e.g., Azar, 2007; Conlin, 2003; Lynn, Zinkhan & Harris, 1993; Whaley et al., 2013). Tipping can be defined as a form of voluntary consumer behavior which entails

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paying a nonobligatory amount for service that has already been provided (Azar, 2007). Whether or not to leave a tip is a decision influenced by social customs, but norms provide a fair amount of latitude regarding how much should be tipped (Lynn et al., 1993). The voluntary aspect makes tipping similar to prosocial behaviors like gift giving and donating to worthy causes, while the tips' dependence on service quality and customer satisfaction anchors the act of tipping in the economic domain. Thus, theoretical bases from social sciences focused on prosocial/helping behaviors are jointly used herein with business frameworks to understand the intricacies of tipping.

The prolific research growth on the topic is attributed to the human-interest factor. The magnitude and prevalence of tipping in consumers' lives are drawing the spotlight on this behavior. Tipping is estimated to exceed \$41 billion annually in the U.S. (Azar, 2009), to take up a substantial part of the \$36 billion untaxed economy in Canada (Beeby, 2012) and to be an essential source of revenue for millions of employees in the service industries across the world (Lynn et al., 2004).

Although the general-level literature is extensive, knowledge regarding the role of individual differences in tipping is very limited; the few exceptions entail studies of gender differences (where it is highlighted that men tend to tip more than women in restaurant settings; Crusco & Wetzel, 1984; Lynn & Simons, 2000) and racial variations (where it is noted that lower tips are received by African-American service providers compared with Caucasian service providers from U.S. consumers, regardless of the consumer race). We bring an additional layer of depth to the understanding of individual differences in tipping by studying for the first time the influence of *sexual orientation*, in conjunction with factors such as gender and physical attractiveness. Furthermore, we integrate theories across disciplines to explain tipping behavior, and bridge two previously disjointed paradigms. When considering the evolution of tipping research, there are two dominant schools of thought: the first where the practice is described and studied as employee-driven, and the second with a consumer-led viewpoint (Whaley et al. 2014). We believe that the two stand-alone sides cannot accurately capture business relations in service interactions, so our studies are embracing both perspectives, providing data from the consumer level as well as the service provider level.

2. Conceptual Development

Research to date has not examined head-on the link between sexual orientation and tipping; however, a systematic scrutiny across literatures suggests that the relationship might be either positive or negative, depending on the underlying motivations for tipping. The reasons why homosexual consumers can be expected to tip more/less compared with heterosexual individuals include the need for belongingness and social acceptance, empathic motivations, concerns with protecting the in-group reputation, perceived service quality, income availability, and attraction-based mating rituals. These aspects are reviewed in turn below.

2.1 Theoretical Support for the Hypothesis that Gay (vs. Straight) Individuals Will Tip More

2.1.1 The Need to Belong: Acceptance and Social Connection Motivation

The need to feel socially connected determines attitudes and behaviors in public consumption situations (Jiang et. al, 2010). The belongingness theory (Baumeister & Leary, 1995) indicates that humans have an innate drive for interpersonal bonds. Although there are cultural and individual differences in strength and intensity, the need to belong is universal (Jiang et al., 2010). People from stigmatized or discriminated social groups — e.g., those negatively stereotyped based on sexual orientation — have a stronger sense of addressing their need to belong (Carvallo & Pelham, 2006). Richman and Leary (2006) state that when the feeling of belongingness is

threatened by social rejection, individuals tend to behave in socially-enhancing ways such as being more helpful or cooperative. The need to belong triggers automatic non-conscious actions that would make people more likeable so that, in turn, they can feel more accepted. For example, women work harder on a subsequent task after being excluded and shunned from a game of ball-toss (Richman & Leary, 2009). Women's harder efforts to gain approval were based on their assumption that groups are more willing to accept hard workers. As Richman and Leary (2009) conclude based on the fundamental need for belongingness, "deficits in acceptance instigate a motive to improve one's relational value". Since tipping is a way to improve one's relational value (i.e., a form of socially desirable behavior), the overall implication is that a homosexual versus heterosexual consumer would tip more in order to feel accepted and appreciated.

2.1.2 Empathy: Helping Motivation

Tipping is more prevalent when consumers feel empathy and compassion for workers and want to show gratitude for the service received (Azar, 2005). Research suggests that historically disadvantaged groups are better able to empathize and recognize adversity, as well as detect the opportunity to behave generously. Empirical studies such as Sergeant et al.'s (2006) examination of male behavior indicate a higher level of empathy among homosexual versus heterosexual individuals. Since higher empathy is linked to increased acts of kindness and generosity (e.g., Barraza & Zak, 2009), it follows that gay consumers would tip more compared to straight consumers.

2.1.3 Concern for Group Image: Motivation to Protect the In-group Reputation

Homosexual individuals identify more strongly with their in-group based on sexual orientation (Jellison et al., 2004). Richman and Leary (2009) point out that people who are highly identified with a group (e.g., the LGBT = lesbian, gay, bisexual, and transgender group) derive a stronger sense of self-worth from the reputation of the group, and are protective of the group's image in society. Consequently, a member's incentive to engage in image-enhancing behaviors (e.g., generous tipping) and avoid reputation-dampening behaviors (e.g., lack of tipping) can be attributed to protective mechanisms for the broader benefit of the group. Thus, tipping can be expected to be higher among homosexual versus heterosexual individuals due to attempts to build and protect the reputation of the LGBT group.

2.2 Theoretical Support for the Hypothesis that Gay (vs. Straight) Individuals Will Tip Less

The theoretical reasons to expect that gay individuals might tip less than straight consumers are primarily related to the resources available for awarding tips. Tipping prevalence is positively correlated with consumers' income (e.g., Azar, 2007), and the literature on sexual discrimination hints to the popular assumption that homosexuals have lower earnings compared with heterosexuals. However, Berg and Lien's (2002) review of studies emphasizes that empirical results are inconclusive; there are substantial variations across countries, and "there is no true generalization about the average earnings of male and female homosexuals taken together as a single bloc". Indeed, in the U.S. homosexual men were found to have earned 16% to 28% less than heterosexual men given similar demographics, but homosexual women were seen to have 13% to 27% higher incomes as compared to heterosexual women (Berg & Lien, 2002). Interestingly, Carpenter's (2008) study found a similar trend in Canada favoring lesbian earners and slightly disadvantaging gay males, but the evidence to date does not elucidate whether on average homosexuals really earn less than heterosexuals. Thus, the assumption of an income-based negative impact of sexual orientation on tipping should be used with caution.

2.3 Moderators of the Relationship between Sexual Orientation and Tipping

2.3.1 Sexual Orientation Compatibility: Similarity Motivation

Previous research on similarity has shown that people who share similar characteristics are more attracted to

each other and also more influenced by each other. In social situations, research has proven that incidental similarity increases “liking, persuasion, and cooperative behaviour between individuals” (Jiang et al., 2010). Therefore, the similarity between service provider and consumer may drive the amount of tips the employee receives. Specifically, gay (versus straight) consumers can be expected to leave higher tips if the service provider is gay (versus straight). In other words, the impact of consumers' sexual orientation on tipping behavior would be moderated by the sexual orientation of the service provider.

2.3.2 Sexual Orientation Compatibility: Mating Rituals

The role of sexual orientation in tipping is likely contingent on the gender and physical attractiveness of the interacting parties, according to the dynamics of sexual attraction. Signaling theory and the literature on sexual selection suggest that competition for females underlies straight men's public good contributions. Vugt and Iredale's study (2012) found that men contributed more (i.e., placed more money in a public group fund) in the presence of an opposite sex audience, but there was no parallel effect for the women. Further, men's public contributions went up as they rated the female more attractive. As Vugt and Iredale conclude, a public contribution is the human equivalent of a peacock's tail. Translating these insights to the social display of generosity through tipping, it can be predicted that straight men would leave more generous tips to attractive female (versus male) employees, and that female consumers would not be influenced by the physical appearance of the employee. Indeed, a preliminary study by Lynn and Simons (2000) in the domain of restaurant tipping hints toward these trends. Yet, Lynn and Simons's investigation did not control for sexual orientation, and presumably their findings are related to a majority straight sample. What about gay consumers? If the logic of signaling and mating rituals applies, gay males should be likely to give higher tips to attractive male employees. For homosexual female consumers, they can either leave more generous tips to attractive female employees, or follow the trend observed for heterosexual females and not be affected by the gender or attractiveness of the service provider.

To test these arguments, two studies are conducted with consumers and retail employees, exploring the impact of sexual orientation on tipping in the context of bar service.

3. Study 1

This field experiment explored actual tipping behavior following a 2 (consumer sexual orientation: gay vs. straight) x 2 (consumer gender: male vs. female) between-subjects design, with variables such as order amount and consumption time included as covariates. Observations of tipping behavior were made at a Canadian nightclub during evenings specifically catering to a homosexual clientele (gay events) and evenings organized primarily for a heterosexual audience (straight events). Using the same retail establishment with two different audiences presented the research advantage of keeping extraneous factors — especially the service atmosphere and the service providers — constant. This was important in light of prior research indicating that the retail atmosphere can play a role in tipping (Azar, 2007). We wanted to be able to clearly delineate the impact of sexual orientation from other key influences on consumers' tipping behavior.

One hundred and twenty individual orders were unobtrusively observed by a trained experimenter who recorded the details of the service interactions and the tip amounts. Data collection was conducted with the permission of the club manager and the collaboration of the bartenders who served customers for the duration of the study. The experimenter observed the service interactions from the vantage point of the consumer area, being situated close to the point-of-purchase for a better view of the tipping jars. Data was recorded on the spot to a

smart-phone and later uploaded into an electronic data file. Variables such as gender of consumer, sexual orientation based on type of event (gay vs. straight), gender of bartender, time of order, bill size, cash register used (located left or right in the establishment), and type of product consumed were examined. Note that the bartenders in this study were predominantly females (i.e., 102 of the 120 observed orders were placed with female bartenders), so the results are mainly revealing consumer tipping behavior toward female service providers.

Data analysis was conducted using a 2 (consumer sexual orientation: straight vs. gay) x 2 (consumer gender: male vs. female) ANOVA design. The dependent variables were tip percentage and tip amount (\$). The control variables that were analyzed and did not have significant effects on tipping are not discussed further.

The results revealed a significant effect of sexual orientation ($F(1,115) = 6.14, p = .015$), indicating that straight individuals tipped more than gay individuals ($M_{\text{heterosexual}} = \$1.59, M_{\text{homosexual}} = \1.04 , see Figure 1 and Table 1). A marginal effect of gender ($F(1,115) = 3.66, p = .058$) was found, such that on average males tipped more than females ($M_{\text{male}} = \$1.50, M_{\text{female}} = \1.04). In terms of tipping as a percentage of the order, as illustrated in Figure 2 straight male consumers had the highest average tip percentage (17.54%) compared to the other consumer groups ($M_{\text{heterosexual_female}} = 15.5\%$; $M_{\text{homosexual_male}} = 13.5\%$; $M_{\text{homosexual_female}} = 6.5\%$). The means comparisons for all experimental conditions taken two at a time are presented in Table 2.

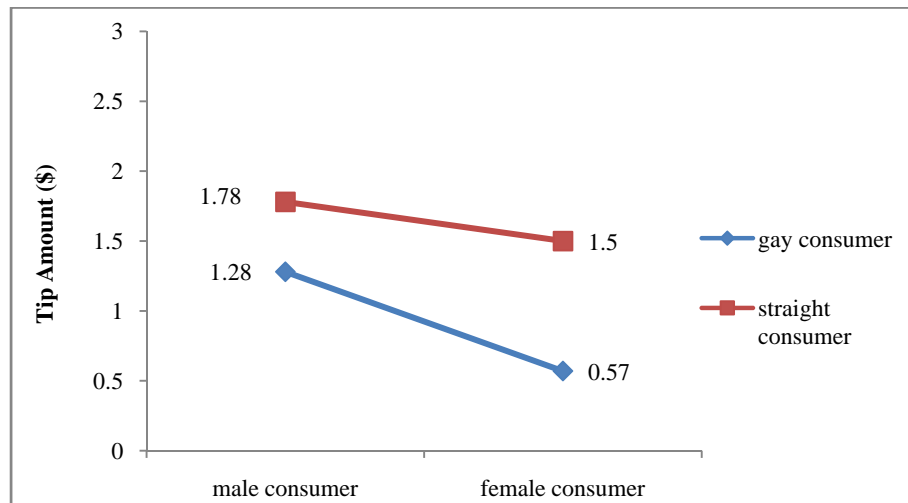


Figure 1 Tip Amount Means (\$) - Study 1

Table 1 Means and Standard Deviations for Tip Amount (\$) – Study 1

Dependent Variable: Tip Amount \$

| Sexual orientation | Gender | Mean | Std.deviation | N |
|--------------------|-----------------|------|---------------|-----|
| Straight consumer | Male consumer | 1.78 | 1.12 | 24 |
| | Female consumer | 1.50 | 1.45 | 51 |
| | Total | 1.59 | 1.35 | 75 |
| Gay consumer | Male consumer | 1.28 | 1.39 | 30 |
| | Female consumer | 0.57 | 0.52 | 15 |
| | Total | 1.04 | 1.21 | 45 |
| Total | Male consumer | 1.50 | 1.29 | 54 |
| | Female consumer | 1.29 | 1.35 | 66 |
| | Total | 1.39 | 1.32 | 120 |

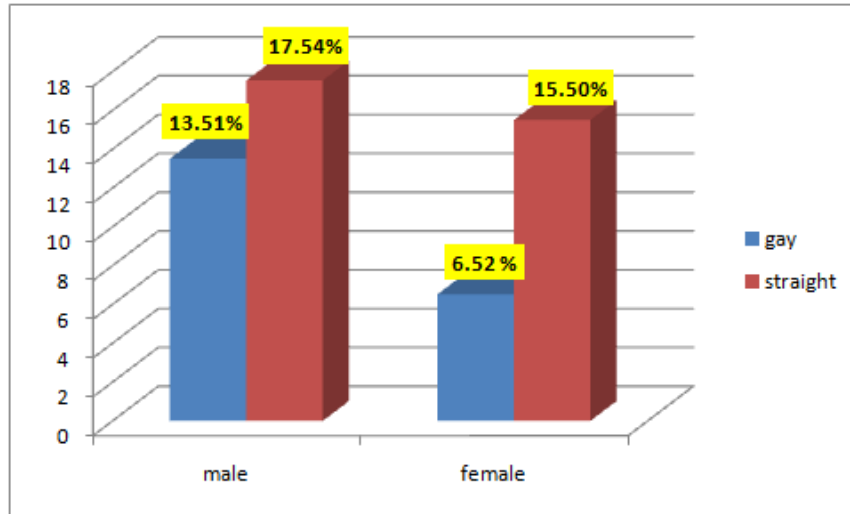


Figure 2 Tip Percentage (% of order) Averages — Study 1

Table 2 Means Comparisons (Paired Contrasts) for Tipping — Study 1

| Contrast | Value of contrast | Std. error | t | df | Sig. (2-tailed) |
|--------------------------------------|-------------------|------------|-------|-----|-----------------|
| 1. Straight male vs.gay female | 1.215 | 0.425 | 2.855 | 116 | 0.005 |
| 2. Straight female vs.gay female | 0.938 | 0.379 | 2.472 | 116 | 0.015 |
| 3. gay male vs. gay female | 0.717 | 0.409 | 1.754 | 116 | 0.082 |
| 4. Straight male vs.gay male | 0.498 | 0.354 | 1.407 | 116 | 0.162 |
| 5. Straight male vs. straight female | 0.276 | 0.319 | 0.864 | 116 | 0.389 |
| 6. Straight female vs.gay male | 0.222 | 0.297 | 0.745 | 116 | 0.458 |

A positive effect of bill size ($F(1,115) = 11.77$, $p = 0.001$) indicated that tips increased as the order amount increased. The average tip amount per order across all consumers in the observed data was \$1.38. The average tip percentage (% of the order) was 14.3%.

Importantly, an ANOVA analysis with bill size as the dependent variable indicated that the order amount was not influenced by consumers' sexual orientation or gender; furthermore, the paired mean contrasts for the order amount of relevant groups (straight males, gay males, straight females, gay females) found no significant effects, highlighting that the differences in tipping were not driven by differential levels of the order price.

Given that the bartenders in this study were primarily female, the tipping results for sexual orientation and gender lend credence to the notion that the higher tips offered by heterosexual (vs. homosexual) consumers are mainly driven by straight men's attempts to impress females, as a "peacock tail" in line with evolutionary mating rituals. Interestingly, gay females do not seem to act in accordance to the same sexual attraction efforts, as their tips toward the female bartenders were substantially lower compared with other consumer groups. Also this lower tipping behavior of homosexual females does not seem to be aligned with the similarity principle dictating that females would be inclined to support other women by giving female employees a higher tip. To obtain a better understanding of tipping outcomes and processes, Study 2 offers insights from interviews with key informants - male and female bartenders varying in sexual orientation, who worked in retail establishments catering to homosexual and heterosexual clientele.

4. Study 2

Study 2 is based on data from bartenders at Canadian nightclubs. The interviews were tape-recorded and transcribed, and the principles of Grounded Theory (Corbin & Strauss, 1990) were used to allow insights to emerge from the data.

The six service providers were equally distributed in terms of gender. One of the gay male informants had a year of work experience with a primarily homosexual clientele except for a few rave nights in which he served a heterosexual clientele. The second homosexual bartender had four years of experience serving heterosexual and homosexual consumers. The straight male informant had one year of work experience working with both groups. Of the female bartenders, one was lesbian and had nine years of experience in the nightclub industry (six years with gay audiences and three years at a primarily straight bar). The bisexual female informant had four years of experience serving both audiences, and finally the straight female informant had seven years of bartending experience (four of them at straight bars).

Data were analyzed by means of an iterative process of examining responses to identify categories and themes (Corbin & Strauss, 1990). A selection of the main insights is summarized here, accompanied by illustrative quotes.

Who tips more? The female bartenders (straight, lesbian and bisexual) and the straight male bartender indicated that in their experience straight consumers tip more. In contrast, the two gay male bartenders indicated that gay consumers tip more. All informants suggested that it is in fact a *mix of gender, sexual orientation and physical attractiveness of both parties* that ultimately seals the deal, particularly when it comes to male consumers. In the words of the straight-female bartender with seven years of experience: “Hot female [bartender], big shot male [consumer] tip very high. Hot female, mousy girl tips very low. Hot bartender, gay man that I don’t know, tips average, if not below. Gay man I know tips higher. Lesbians, they kind of just straight line it all the way through, I’ve never really had a big tipper. If I’m uppity and dancing, I’ll still make money”.

The level of energy and enthusiasm of the bartender was a recurring theme. While this is broadly consistent with research on the role of service employee performance (e.g., Whaley et al., 2013), it is intriguing that none of the bartenders mentioned the factors heralded by prior business research such as employee experience, competence, or training. This opens up the possibility that in the night scene business, aspects of human contact and personality are more important than traditional performance measures.

The female bartenders’ statements that straight (vs. gay) consumers tend to leave better tips are qualified by the acknowledgement of different patterns of patronage behavior (discussed in the next paragraph) and are importantly echoing the straight male use of tipping as a peacock tail — the effect found in Study 1 supporting the theory on public consumption behavior and sexual attraction (Vugt & Iredale, 2012; Lynn & Simons, 2000). In fact, the straight female employee explicitly pinpointed the influence when asked about rules of thumb that she uses as a bartender to determine if someone is going to be a good tipper: “Men who usually come up with women as a couple tend to tip more because they want to impress her.” Interestingly, the homosexual bartenders’ statements that in their experience gay (vs. straight) consumers tend to tip more reveal a similar pattern of sexual attraction practices for homosexual males: “I think if a gay man is ordering from me and he thinks I’m attractive, he’ll tip more”; in the words of the other gay employee: “Bartenders get really good tips because they’re attractive. [...] I could see myself tipping an attractive bartender a lot. [...] Just because well... the attraction. That would be like, I would say that because I get tipped more here [a gay bar event] because I feel as though people are attracted

to me here so they tip me better. Uhm, (pause) whereas straight people, it doesn't really matter. I would say when there isn't an attraction involved, it's based on other things like how friendly you are, how good of service you give them. But when you add attraction to the mix then those things don't really matter." This influence was also identified by the straight female bartender: "Gay men I find will tip male bartenders a little bit more or tend to go towards them a little bit more." Overall, male consumers — both straight and gay — are using tipping behavior as a signaling mechanism to impress and attract potential sexual partners. For female consumers tipping does not seem to be within the purview of impression management rituals related to attraction, for either heterosexuals or homosexuals. The straight male bartender did not point to receiving higher tips from female consumers, and the gay and bisexual female bartenders also did not indicate particularly good tips from lesbian consumers.

Different patterns of patronage behaviour for homosexuals versus heterosexuals were pointed out by multiple informants: while gay people tend to go out more often, straight people go out less but spend a larger amount on each occasion: "they blow more money and have more money to tip when they [do] go out" (bisexual bartender, 4 years experience).

As the night goes by... a significant increase in tip value occurs. Part of this increase is attributed to alcohol intake, consistent with insights from existing research (Lynn et al., 1993). However, an interesting theme of relationship-building also emerged as a key explanation: if a consumer continuously purchases drinks from the same bartender, a personal relationship is developing. Consumers "get a little more friendly with you because they've warmed up to you and you've also warmed up to them" and in return tips are better. Co-participation in the creation of fun moments ("having a good time") is an intrinsic part of the bonding.

One of the informants (gay male, four years of bartending) opened up the possibility that tipping can be predicted by consumer's individual traits such as social skills and degree to which they have an extraverted personality: "people who are more social and more talkative usually tip more". However, since this did not emerge as a theme from the other interviews, nor is it substantiated by existing theoretical accounts, we consider it an open trail for future scholarly work.

5. Practical Implications

Our studies are providing a first-hand account of the relationship between sexual orientation and tipping in public service interactions. Until the last decade, sexual orientation was considered taboo in business research (Solomon et al., 2014). This explains in part the lack of literature regarding sexual orientation's impact on tipping. Fortunately, as modern times are embracing an open and more inclusive society, while at the same time the size and business attractiveness of the LGBT consumer segment increases (e.g., Kates, 2004), it becomes apparent that studying aspects of sexual orientation is a necessary attempt for a richer understanding of the world we live in.

Debunking tipping processes adds value to economic relations from a number of different perspectives. As emphasized by Azar (2007) and Whaley (2013), knowledge of tipping differences has value for business managers because it enables them to train service employees, presuming that additional earnings in tips will increase job satisfaction, lead to better retention and better service. Naturally, frontline employees themselves are the most direct beneficiaries of the present studies' insights. Based on sexual orientation and gender, service providers can now adjust employment efforts and co-ordinate shifts with other employees to serve customers in a way that maximizes service satisfaction (e.g., co-ordinate efforts such that gay male bartenders would attend to the male clientele during gay nights/events, while female bartenders would serve the heterosexual clientele being respectful

and mindful of straight men's impression-related needs). Furthermore, employees can find it useful to understand that a lower tip from lesbian consumers is not a reflection of underperforming service, but in fact might be an expression of human-relationship value, as explained in the next theoretical section.

Our findings have implications for individual consumers, since everyone is confronted with tipping decisions in daily life. Armed with knowledge about tipping mechanisms and understanding the ways in which individual characteristics predict tip expenditures, consumers can adapt their budget management, engage in active monitoring and develop more accurate spending forecasts aligned with personal goals. Further, since tips are intrinsic to contextual norms, consumers can find it interesting to learn the tipping habits of people in socio-economic groups with which they identify, and use such information as a benchmark for assessing their own behavior.

6. Theoretical Significance and Directions for Future Research

The present research raises candid and uncharted questions regarding face-to-face business relations in contexts that involve tipping. To answer the question whether gay consumers tip more than straight consumers, despite theoretical inferences supporting this prediction our empirical studies show the opposite trend: heterosexuals tip more than homosexual individuals when it comes to rewarding female service providers. This intriguing effect is primarily driven by straight males' higher tips, and can be explained with attraction signaling theories, whereby straight males are engaging in "peacock tail" behaviors to impress women.

When being served by male employees, the "peacock tail" emerges (from the interviews data) as a feature of gay male consumers who are leaving higher tips due to attraction-related considerations. Thus, both gay and straight males are using tipping as a gesture of public generosity aligned with signaling rituals.

The relatively low tipping behavior of homosexual and heterosexual women cannot be adequately captured by existing frameworks, e.g., attraction theories, in-group behavior, similarity principles, empathy, discrete emotions, or self-esteem theories. Before forwarding our own explanations on this interesting topic, we highlight the boundaries of the present enquiry.

First, the findings are based on Canadian data, so enhancing the scope with cross-national examinations is a worthy pursuit. Second, sexual orientation should cover the whole spectrum of LGBT consumers and is best conceptualized as a fluid continuous scale rather than a category-based factor; our data focuses on straight, gay and lesbian individuals, with limited responses from the bisexual segment and no coverage of the transgender community. Third, Study 1's observational sample used sexual orientation inferred from the type of events attended by consumers (gay versus straight events); the managers confirmed that the overwhelming majority of clientele was indeed homosexual/heterosexual according to context, but using self-reported measures of sexual orientation would be a welcoming extension. Finally, while Study 2 produced relevant themes for understanding the psychological processes involved in tipping, more can be explored in this area.

For example, what can explain the puzzling low tipping behavior of lesbian consumers, particularly toward female employees? We put forth three explanations to the scrutiny of scholarly pursuit. These explanations can provide meaning not only to lesbian behavior, but also to the lower tips from women in general.

First, women (vs. men) can be less inclined to view the display of public generosity through tips as a means to improve one's relational value. The assumption of lower signaling value for female tipping with regards to status-enhancement can be traced to traditional gender roles, where money affluence is more related to "the

peacock tail” for men than for women.

The second explanation is related to the economic/social expression of appreciation. Lynn et al. (2008) posited that tipping weakens social relationships. Since money is used as a medium of economic exchange (generally considered inappropriate to give cash as a gift in close social relationships), tipping can reduce the customer-employee interaction to an economic transaction. Consequently, lower tipping occurs when individuals place high value on social versus economic relationships (Lynn et al., 1993). Since women do place a higher value on social relationships (Richman & Leary, 2009), it is possible that they are focused on expressing appreciation not through tips but through non-monetary courtesy.

The third explanation is based on Lynn et al.'s (1993) observation that tipping is less prevalent in countries where consumers have low tolerance for interpersonal status and power differences. To the extent that homosexual females (or females in general) have low tolerance for status disparities, their subsided tipping behavior might be a way to level off power differences between consumers and service employees.

A final idea for future research is to examine whether tipping effects of sexual orientation exist in additional occupations where public relations are essential. For example, would tips at hotels or for taxicab services not be affected by the sexual orientation of the interacting parties, and if so, what may trigger occupational variations in tipping? Hopefully the present research will encourage scholars to add to the discourse on this interesting social phenomenon.

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E-complaint Services for Consumer Goods. Results from an Empirical Analysis in Italian Supermarkets

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Abstract: Customer satisfaction is one of the most important issues concerning business organizations of all types, which is justified by the customer-orientation philosophy and the main principles of continuous improvement of modern enterprises. Nowadays most companies operate multiple channels including Internet. For companies, receiving a complaint by Internet is particularly attractive as online complaint management increases both the efficiency and effectivity of complaint management. Moreover, complaint channel choice and online consumer complaining behavior have received only limited attention. The aim of this paper is to verify the after sale service of 138 companies producers of consumer goods. In particular, this study measures the response time and the quality of the answer after a complaint sent by email or web form. The sample is composed of food (no fresh, no private label) goods and they are randomly selected from the shelf of supermarket. In our sample, a small percentage of companies don't write the Internet site or an email address on the product's label (14%). Only large enterprises and multinational companies answer in less than 24-48 hours. Often they personalize the reply and only in few cases they surprise their customer with something the customer doesn't wait. Probably, small and medium enterprises don't consider the customer service a main component of the business.

Key words: web service; complaint; consumer goods; customer service

JEL codes: M300, M310

1. Customer Satisfaction and after Sale Service

Traditionally, companies have relied only on differentiation of products and services to retain their customers and also to satisfy the consumers. However, times have changed, due to fierce competition from new players entering the market, imitation of new features and increase in number of new offers, customers have acquired new choices and they have also become more price sensitive, which has forced marketers to adapt differentiated and customer oriented strategies in order to enable them to stand out in the competition and gain a competitive edge. According to Singh (2006), one of the fundamentally important drivers of organizational success is that enterprisers must take the needs and wants of their customers into account. That is the reason why the researcher such as Reicheld & Sasser (1990); Ciavolino & Dahlgaard (2007), Singh (2006); Carpenter (2008) have paid attention to the importance of customer satisfaction, loyalty and retention have been continuously paid attention

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Customer satisfaction is considered very important, it shows how firms are committed to provide quality product or services to their customers that eventually increase customer loyalty. Organizations have to provide better after sale services to retain and satisfy its customer. Making and retaining valuable relationship with customer while using every aspect of taking, retaining and enhancing customer is known as customer relationship management (Kotler & Armstrong, 2010). After-sale services make customer safeguard and without having an effective service, market share can be reduced. So services to customer are not business but it is the main component of the business (Bozorgi, 2007).

After-sales, referring to the activities taking place after the purchase of a product, has been seen as not only a profit source but also a significant differentiating factor among companies (Wise & Baumgartner, 1999). After-sales can of course be understood widely, to describe a variety of activities. However, it can also be seen as only a “product support” activity (Lele & Milind, 1997). Often remaining as the only point of contact with the customer after purchase (Gallagher et al., 2005), the support activities have a significant impact to brand perception and customer retention (Alexander et al., 2002).

Organizations are more customers oriented they have to satisfy their customers, the satisfied customer enables organization to retain more customers, which results in high sale turnover, higher productivity and profit to the organization. Customer satisfaction is related with loyalty of the customer and financially stable performance of the firm (Loveman, 1998). Customer satisfaction must be the primary objective of the organization for success and growth (Pertson & Willson, 1992).

2. Complaint Management on Internet

The management of complaints is a part of service provided to customers. “Service recovery is essential due to the inevitability of service failures” (Goodwin & Ross, 1992). If a company does not handle service complaints accordingly it may lead to negative and harming word-of-mouth and the customer will be lost to competition (Tax et al., 1998). According to Sparks and McColl-Kennedy (2001), service recovery is a necessary tool in order to keep ones good reputation, avoid bad PR and have satisfied as well as loyal customers.

According to Schoefer and Ennew (2005) regardless of the procedure, “customers expect a speedy, confident, fair and personalized complaint handing”. Goodwin et al. (1992) found that an apology is a crucial part of the service recovery process and since it will diminish the negative feeling the customer has towards the company

Traditionally, customer complaints were regarded as negative events, i.e., as indicators of quality concerns or corporate failure. Hence, a majority of companies engaged in defensive communication strategies by denying the complaint issue, offering materialistic solutions ‘out of courtesy’ or simply ignoring the complaint (Dubé & Maute, 1998; Hansen et al., 2010).

Yet, with the rise of customer-centred marketing philosophies and the systematic development of relationship management strategies in the 1990s, complaints were increasingly understood to be personalized communication opportunities at the request of the customer (Homburg et al., 2010; Volkov, 2004).

The growing influence of the Internet at the start of the new century and the more recent social media networking trend have consequently exposed the passivity of prevailing complaint management strategies with regards to profiling and effectively communicating to e-complainers. As such, the public, intertextual and instantaneous character of online communication channels (e.g., public forums, virtual worlds or Twitter)

necessitates the transformation of existing complaint management approaches into pro-active, multidimensional and continuous e-communication strategies (Khammash & Griffiths, 2011).

From a consumer's perspective, the Internet has significantly lowered the psychological barriers to complain as customers are in full control over the extent and depth of the communication exchange with regards to content, timing, self presentational cues and subsequent reciprocity (Kozinets et al., 2010).

In the e-complaint context, the response speed constitutes the quality perceived by the customer. In this case a trade-off involves the choice between personal and automated response communication. Numerous studies indicate the superiority and positive effects of personalized feedback on e-consumers post-complaint evaluation (Smith et al., 2010). However, at the same time, online communication seems to carry an inherent expectation of timeliness, i.e., instantaneous feedback which, if delayed, has negative consequence on customers' corporate responsiveness perceptions (Matzler, 2005; Neale et al., 2006). Despite the aforementioned current predominance of automated e-mail response communication strategies, recent studies on complaint classification systems and agent-based complaint profiling systems seem to indicate a trend towards facilitated e-personalization of response message communication (Galitsky et al., 2009).

3. Methodology

The objective of this study is to verify the after sales services of manufacturers that sell customer goods. An empirical method has been used to measure the customer service.

Effective e-complaint service is a key to customer retention. Consumers asserting that they will not make a repeat purchase or continue with the company's services in bad experience. In order to attain new customers and retain the older one, an effective after sales service cannot be ignored. According to Palmer (2002) the main purpose of providing after sales services to customers is through this mechanism the company is able to maintain relationships with customers.

In this study we have selected 138 different goods from the supermarket. All the products have been selected randomly from the grocery. Following we present the main research phases:

(1) Product selection: food products, no fresh, and no private labels. Private labels are product sold under the retailers brand instead of the manufacturers (Burton and al., 1998) and in this study we aim to investigate the manufacturer's behavior. The price of products are between 1.10 € and 6.99 € because they are the foods most selling in the supermarkets (Nisticò & Anania, 2011).

(2) Channel detection: on the product usually there are or the internet site address, or customer service email, or a toll free number.

(3) Data base compilation: for every product we record the purchase date, the product, the company name, and all the information inherent the customer service.

(4) Simulation: we send a complaint by email or by form. In this message we declare that product we purchased has some problems or in the packaging ("Your package has a problem when I open it", "The product is very different from the image on the pack"), or in the taste ("In this batch the taste of the product is not like as usual"), or we needed more information about the mode of employ ("Can I use you product with..."). We record the day and the hour of sending in our data base.

(5) Waiting of the response. After this first contact, we wait the response. When an answer arrives, we analyze the message received.

(6) If the response time is greater than one week, we solicit the company using a different channel or the free toll number.

(7) Answer analysis. When the answer arrives, we analyze:

- Response time: It represents the period of time from the question to the answer. Response time have an impact on satisfaction level of after sales services. The satisfaction received from after sales service varies significantly with response time of solving complaints. The quicker the problem is resolved the more satisfied customers are with the services (Banerjee S., Singh P., 2013).
- New requests: it represents the need to solicit the company for an answer. These are surprising results given that past research has demonstrated that customer satisfaction is significantly affected by the difficulty to receive an answer (Stiefbold R., 2003).
- Personalization of the answer: Usually companies can answer in two ways: automated message; personalized message. The personalization has more value added than the automated answer or a preformatted message. Company can create strong bonds with customers by individualizing and personalizing relationships (Kotler & Keller, 2009).
- Complaints resolution: Explanation of the problem and highlighting of the solution. Halstead and Page (1992) demonstrate that for complainers who were dissatisfied with the product, however, satisfaction with complaint resolution did lead to significantly higher repurchase intentions (Halstead, Page, 1992).
- Plus: it represents something the customer doesn't wait. This is something different from the mere answers or apologizes, and can be a coupon, a gadget or a new product to test. The overall rule of thumb for compensation at service failures should be "well dosed generosity". Also, over-generosity does not seem to result in higher repeat purchase rates (Priluck & Lala, 2003)

4. Results

We checked 138 different goods selected in Italian supermarkets in the North Italy area. There aren't any customer service indicated on 19 labels, only the company address and in some cases a toll free number.

After the sending of the complaint, in 10 cases the answer arrived in a period beneath 24 hours, 18 cases within 48 hours and in 15 cases in a period beneath 72 hours. 37 companies did not answer. In a study, Zaugg (2001) affirms that while most customers expect an answer within 24 hours, customer care managers are convinced that two to three days is an appropriate response time for straightforward problems. This disconfirmation of customer expectations leads to a low perceived probability of success for online complaints, which in turn reduces the likelihood that computer-mediated communication will be chosen for complaining in future.

We sent 31 reminders when the response time was greater than a week. In this case, we have used or Web form or a toll free number. Only in 8 cases we received an answer. In the case on the telephone contact, often we found a pre-recorded message.

If we consider the total cases (82) with a response, 21 companies replied with automated messages, while in 61 cases companies used customized messages. Customers who feel they are treated as individuals are more satisfied with their experience and more inclined to remain loyal and loyal customers buy more, purchase more often (Ball et al., 2006), cost less to serve, and have higher retention rates. Authors stated that the cost of attracting a new customer is five times more than the cost of retaining an existing customer (Berry & Parasuraman, 1991;

Reichheld & Sasser, 1990). Loyalty is defined as a “deep commitment and for a customer to become and remain loyal, he or she must believe that the organization he has opted for will continue to offer the best choice alternative” (Oliver, 1999). Personalization of a message is very important because “Personalization is about building customer loyalty by building a meaningful one-to-one relationship; by understanding the needs of each individual and helping satisfy a goal that efficiently and knowledgeably addresses each individual’s need in a given context” (Riecken, 2000).

Table 1 Main Results of the Research

| | | | | | | | | |
|----------------|-----------------------------|-------|---------------|---------------------|---------------------------|---------------------------|--------------------------|--------------------|
| Type of answer | Customized and solution | 25 | | 4 | | 2 | 9 | 10 |
| | Customized and postponement | 36 | | 11 | 6 | 10 | 9 | |
| | Automatic response | 21 | | 16 | 2 | 3 | | |
| | No | 37 | 37 | | | | | |
| | Total | 119 | 37 | 31 | 8 | 15 | 18 | 10 |
| | | Total | No | Greater than 1 week | Between 3 days and 1 week | Between 2 days and 3 days | Between 1 day and 2 days | Less than 24 hours |
| | | | Response time | | | | | |

25 companies have explained the origin of the problem and suggested a solution, while 36 companies have postponed the solution to another email or contact. A justification has been commonly used, namely in 30% of the responses. This represents the “Responsiveness” in the Parasuraman and Berry’s model. Responsiveness is the willingness to help customers and provide prompt service. A Johnston’s study emphasizes that it is a crucial factor, as it is a key component in providing satisfaction and the lack of it is a major source of dissatisfaction (Johnston, 1995).

In 4 cases vendors exceeded expectations of customers. Kotler and Keller (2006) explained that the delivery of high customer value or exceeding expectations of customers, by what is important to customer, is the key to success. Gould (1995) supported it and added that the organization should exceed the expectations of the customers’ especially on value, service and dealing with complaints because “a loyal customer serves as testimonial, distributes positive word-of-mouth, and loves to use the company’s services”. These are the best practices of our sample:

- A coffee company sent us a good to replace the old one;
- A company operating in the production and commercialization of bakery products and a manufacturer of branded chocolate and confectionery products sent us a sample of their goods.
- A producer of orange juice sent us a little gadget

Large enterprises and multinational companies (32) are more ready to solve a complaint by email. According with Schilirò, small and medium Italian enterprises highlight the low use the customer service (Schilirò, 2012). In our research, eight of ten companies that responded in less than 24 hours are large enterprises or they are a part of multinational group.

5. Conclusions

The main objective of the research was to identify if the customer goods manufacturers use an Internet based complaint service. Moreover, this study would evaluate the time to response and the quality of the message after a complaint. A large amount of companies writes the customer service address on the label. Only a little percentage

of our sample answer to the complaint in less than 24 hours, while a large percentage don't answer to complaint. This represents the lack of an effective e-complaint service on the majority of the sample. Likely, managers disregard evidence that shows how complaint service provides a significant financial return. In some cases, companies fail to make easy for customer to complaint or give feedback.

Large companies recognizing that current customers are a valuable asset base, while small and medium enterprises need to develop effective procedures for complaints following unsatisfactory experiences and they don't consider the customer service a main component of the business. Even if many researcher put in evidence that the personalization of the answer can create strong bonds with customers, in our sample many companies use preformatted email. Internet is mainly used to present products and company, but at moment doesn't represent an effective channel to manage complaints.

This research analyzed only food consumer goods. New researches should evaluate if exist differences between food and no-food industries. Another weakness of this study is the region of Italy of the sample. Many products have the origin from the same region. Perhaps a different sample in a different region can give different results.

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Sustainability Risk and Crisis Management: The Taoism's Perspective

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Abstract: The paper examines how Taoism, particularly, the Taoist bible, the Tao Te Ching (the Way and the Virtue), written by Lao Tzu over 2500 years ago, can be of relevance for business managers and leaders who wish to enhance their leadership qualities in sustainable risk and crisis management. Taoism is one of the most influential philosophies in the world, and the Taoism's wisdom reflected in the Tao Te Ching has inspired and guided people with precepts of harmony, compassion, cooperation, integrity, humility and prudence over the past years. The political and business leaders have drawn inspiration from the Taoism's wisdom to govern their organizations effectively and successfully. Today when the human community is facing the heightened contemporary fears about increasingly fractured relations between humanity and natural world, from resource depletion and species extinction to pollution overload, the classical wisdom of Taoism provide new insights and values for human community to be in search of the solutions to social and environmental crisis and new and sustainable relationships to the earth. The paper combines the ancient wisdom with lessons from successful leaders to provide the different resources and approaches to sustainable risk management.

Key words: Taoism; wisdom; risk and crisis management; sustainability; social responsibility

JEL code: M140

“Heaven is eternal and Earth is everlasting.
Not living for themselves, but giving life to all,
Thus they endure forever.
The Sage
Placing himself behind,
Finds himself in the front
Putting himself away,
Finds himself remain.
Being selfless,
Attains fulfilment”
—Laotzu's Tao Te Ching, Chapter 7

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“In handling things people usually fail,
When they are about to succeed
Be as prudent at the end as at the beginning,
There will be no failure”
—Laotzu's Tao Te Ching, Chapter 64

1. Introduction

This paper is to examine and analyse the social and sustainable risk and crisis in today's business world and provide an overview of different approaches to risk management from the Taoism's perspective. Combining academic rigour and management science in the West with the Eastern thought-the wisdom and philosophy of Taoism offers an important resource and approach for organization and business leaders concerned with sustainability and risk management.

Taoism has been one of the most significant components of classical and contemporary Chinese cultural values and philosophy. The ancient Chinese thinkers, Laotzu and Chuangzhu, along with the practices, have been used as key Western inspirations in religion, philosophy, ethics, politics, ecology and health. Taoism has begun to penetrate different aspects of modern life, from lofty spiritual quest to everyday matters of health and diet, its relevance to contemporary concerns about the environment, peace and war, gender issues and life in modern societies.

The set of philosophical teachings and practices of Taoism rooted in the understanding of the Chinese Tao was founded by Laotzu in the 600 B.C. in his work *Tao Te Ching (The Book of the Way and its Virtue)*. The Tao, the underlying cosmic power, creates the universe, supports culture and the state, saves the good and punishes the wicked. Literally the Tao refers to the way things develop naturally, the way nature moves along and living beings grow and decline in accordance with cosmic laws (Kohn, 2008). Tao Te Ching laid the philosophical foundation for the religion's beliefs, and also offers ideational principles and practical guidelines for today's business, government and leadership.

Today, when the human community is facing the heightened contemporary fears about increasingly fractured relations between humanity and natural world, from resource depletion and species extinction to pollution overload and toxic surplus, the classical wisdom of Taoism provide new insights and values for human community to be in search of the solutions to social and environmental crisis and new and sustainable relationships to the earth.

This paper will concentrate on the wisdom and principles of Laotzu's Tao Te Ching and apply some of the principles of the Tao to sustainability risk management.

2. Doing Business in an Uncertain World

As early as 2500 years ago, Laotzu, the founder of Taoism, had seen the phenomenon of the uncertainty, and its impact on individuals and society. The uncertainty breeds risk and opportunity for organizations and individuals. Laotzu expresses his concern about the uncertainty in his book of Tao Te Ching in Chapter 58 (hereinafter “Ch.58”):

¹ The version of Tao Te Ching in English that we used in the paper was translated by me built on dozens of the existing English versions and my comprehensive knowledge of Chinese culture and history. Our purpose is to embark on a quest to deepen spiritual understanding of values and wisdom of Tao Te Ching and applying them in modern business management.

Good luck leans on bad luck,
And bad luck lurks behind good luck.
Who knows whether one shall rise to another?
The outcomes of the process are uncertain,
Normal can change into abnormal,
Good can change into evil.

The passage depicts a world dominated by uncertainty and change, which is full of big, consequential forces that we can neither predict nor control. Luck event is uncertain, uncontrollable, and consequential, and can bring about risk and opportunity. Rapid change comes uncertainty, and uncertainty comes risk and opportunity. In an uncertain world, one can get bad luck (risk and crisis) yet create a good outcome (opportunity), but equally, one can squander good luck (opportunity) and get a bad outcome (risk). The difference can be made in what people do with the luck (risk and opportunity) they get.

This is also true of today's reality. It is obvious that economic and financial globalization and the expansion of world trade have brought substantial benefits and opportunities to companies, but globalization also poses novel sources of uncertainty and risks. Multiple business indicators show that the level of uncertainty for corporate leaders has increased, due in large part to:

- Large extended enterprises made up of independent organizations but with tremendous pressures to grow and perform as a unit;
- Rapid rates of change in technology, connections and information flows as a result of globalization; and
- Problems in managing scale using methods rooted in controlling all decisions across the entire extended enterprise (Kytte & Ruggie, 2005)

The result of the greater interdependencies and hidden vulnerabilities that businesses now face is an increased number of uncertainties in corporate decision-making. Current network-based operating models highlight the growing importance of the extended enterprise by establishing greater connectivity among and between stakeholders across the globe. This connectivity has also created entirely new stakeholders and requires innovative forms of risk management.

Most companies seem to do well when the future is reasonably predictable and uncertainty is low, but fail spectacularly in a discontinuity - a sudden change in the environment. Many companies seem to have difficulty adapting to a shock or a heightened level of uncertainty — something they are not used to. Many attempt to tackle uncertainty by trying to eliminate it through cleverly crafted hedges — mechanisms that allow them to remove uncertainty from one part of the business or the other. Attempting to eliminate uncertainty is costly and reducing uncertainty in one part of the business may increase the overall risk faced by the company and make it vulnerable to shocks. Increasing flexibility is a much better way to manage and to take advantage of uncertainty, reducing risk and increasing economic value. This is one of Taoism's principles: *reversal is the movement of the Tao* (Tao Te Ching, Ch. 40). It means that the course of the Tao is one of reversal, situations turn around and change to their opposites. This can be said with respect to good and bad luck. In an uncertain world, business leaders must be able to equally accept the opposing segments or phases of the movement of the Tao without being one-sidedly attached to a singular element.

3. Why Sustainability Risk Management?

3.1 Sustainability: The Business's View

The concept of sustainable development or sustainability has been interpreted and defined in different time and circumstances since it emerged. The term has many meanings, depending on the subject and context. The term sustainable development rose to significance after it was used by the Brundtland Commission in its 1987 report *Our Common Future*. In the report, the commission coined what has become the most often-quoted definition of sustainable development: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

When we interpret it from the perspective of triple bottom line, sustainability is concerned with social responsibility, environmental and economic (or business) sustainability. This requires that a company's responsibility should lie with stakeholders rather than shareholders. Environmental sustainability describes the capacity of the environment to continue indefinitely to provide a healthy place for us to live and work and the resources necessary to sustain a healthy economy and businesses. Business sustainability can be defined as the capacity of a business enterprise to continue to operate successfully, i.e., to generate sufficient and appropriate economic activity to meet stakeholders' requirements on an ongoing basis. Of course, we believe that business sustainability is the most critical long-term objective of most business enterprises. While these two types of sustainability are different, they are also, in today's world, inextricably linked. If the environment ceases to be sustainable, enterprises that depend on it for resources and on healthy consumers for purchases of their products will cease to be economically sustainable. The gradual reduction in the sustainability of our global environment will result in the consequent reduction in the ability of business enterprises to sustain themselves economically and remain viable. At the same time, enterprises that are not economically sustainable — those that require more and more energy and non-renewable resources and that pollute the environment — will ultimately contribute to environmental unsustainability as well.

3.2 Sustainability: The Taoism's View

The values and ideas of corporate social responsibility (CSR) and sustainability are embedded in the principles of Taoism. Laozu says (Ch. 7)

Heaven is eternal and Earth is everlasting.
Not living for themselves, but giving life to all,
Thus they endure forever.
The Sage
Placing himself behind, finds himself in the front
Putting himself away, finds himself remain.
Being selfless, Attains fulfillment

The passage defines the concept of CSR and its relationship with sustainability by using the metaphor of Heaven and Earth. What a socially responsible business does should like the Heaven and Earth does, are utterly free from self-interest. The selflessness and altruism allows them to carry on their mutual giving and taking without harming each. They do businesses in accordance with the principle of Tao and Te (Virtue) (Ch. 51):

“Creating all creatures in the universe,
But they do not demand from them;
Developing them, but do not take credit from them;
Leading them, but do not control them”

The principle of the Tao in the passage illustrates the relationship between social responsibility and sustainability. It reflects the core elements of corporate social responsibility: voluntary contribution to community and society beyond the self-interest. By doing it in a socially responsible manner, business can be sustainable socially and economically. Just like (Ch.7 and Ch. 81):

“The sage places his self-interest behind, but becomes a leader;
Puts himself away, but yet finds himself protected.
Is it not because he lives only for himself?
That's why his self-interests can be accomplished”
...
“The more they help others, the more they possess.
The more they give to others, the more they gain”

In Laotzu's Tao Te Ching, many passages touch on the concept of sustainable development. One of important definitions of sustainability is about concept of life cycle and its impact. Laotzu (Ch. 16) says:

All creatures come into being; I thereby observe their life cycle:
All things grow and flourish, but each ends up returning to its origin.
Everything rises and falls, but ends up returning to its root.
Returning to the root, one shall attain tranquillity;
Attaining tranquillity, one shall return to its nature;
Returning to one's nature, one shall understand the universal law.
Understanding the universal law leads to enlightenment,
Not understanding the universal law leads to calamity.
Understanding the universal law, one shall be inclusive,
Being inclusive, one shall be fair,
Being fair, one shall become the stewardship,
Being the stewardship, one shall act in accord with law of nature,
Acting in accord with law of nature is in line with the principle of Tao.
Holding on to the principle of Tao, one shall be everlasting, and free from danger in life.

Sustainability is one of the important topics of Laotzu's Tao Te Ching. This passage demonstrates that Taoist sustainability is closely related to the sustainability of natural processes or “cycles” of production and reproduction. This is most obvious in regard to four seasons, which are a basic pattern of regulation in an agrarian society. The sustainability course of the four season orders human activity and labour. The regular return of the seasons, the renewed growth of life in spring, is a cornerstone of human and cosmic survival — the sustainability of the productive course of time is fundamental for sustaining both nature and culture. The “new birth” of life in the course of time is not entirely a new birth; it is rather the seamless continuation of a process of reproduction, and of life and death, which is never essentially interrupted. However, in order to sustain the life cycle, all creatures must act in accordance with the law of nature, which is unchanging and universal principle. All creatures in the universe can grow and develop sustainably only by complying with the law of nature. Otherwise, they end up disaster and calamity. In this view, sustainability is the endurance of systems and processes in the universe, and is about how biological and ecological systems remain diverse and productive.

If we take nature itself as our today's model, this passage implies that sustainability should become a cradle-to-cradle process and a powerful growth engine. In order to guarantee more sustainable business practices into the future, businesses must reduce their company's ecological footprint and increase their resource efficiency and productivity so that resources are not unnecessarily depleted or permanently damaged, and still ensure a

sufficient profit and the creation of social value.

Laotzu's life cycle thinking is related to product life cycle management and assessment in today's business world, which is a new approach to sustainability emerging as companies consider their total environmental impact-from growing raw materials to the consumer's disposal of their product. The United Nations Environment Programme (UNEP) and the Society for Environmental Toxicology and Chemistry (SETAC) launched in 2002 an International Life Cycle Partnership, known as the Life Cycle Initiative (LCI), to enable users around the world to put life cycle thinking into effective practice. Life Cycle Thinking (LCT) is about going beyond the traditional focus and production site and manufacturing processes to include environmental, social and economic impacts of a product over its entire life cycle. The main goals of LCT are to reduce a products resource use and emissions to the environment as well as improve its socio-economic performance through its life cycle. This may facilitate links between the economic, social and environmental dimensions within an organization and through its entire value chain.

Life cycle thinking is made operational through life cycle management (LCM). LCM is a management approach that puts the tools and methodologies in the life cycle thinking basket into practice. It is a product management system that helps enterprises to minimize the environmental and social burdens associated with their product or product portfolio during its entire life cycle (UNEP, 2007).

From the social and environmental perspective, this passage says "*Understanding the universal law, one shall be inclusive, being inclusive, one shall be fair*". Inclusion and fairness entail not only the distribution of resources within nature and society at a point of time, but also the distribution of resources across generation. This concept of sustainability is exactly in line with the one defined in the Brundtland Commission Report: "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*"

Laotzu calls upon us to keep to fairness so that we can take on the stewardship which is the idea that the living generation must be stewards of the earth's resources for the generations that will come later. We must defend the interests of those whom we've never met and never will, those are our descendants and our fellow humanity. What qualities and responsibilities should a steward embrace?(Hamel, 2012) elaborates well the concept of steward. Hamel claims that if you are a leader at any level in any organization, you are a steward — of careers, capabilities, resources, the environment, and organizational values. What matters now, more than ever, is that managers embrace the responsibilities of stewardship. He suggests that stewardship imply five things:

- *Faith: A propensity to view the talents and treasure at one's command as a trust rather than as the means for personal gain.*
- *Charity: A willingness to put the interests of others ahead of one's own.*
- *Prudence: A commitment to safeguard the future even as one takes advantage of the present.*
- *Accountability: A sense of responsibility for the systemic consequences of one's actions.*
- *Equity: A desire to ensure that rewards are distributed in a way that corresponds to contribution rather than power.*

Hamel's five qualities of stewardship reflect in Laotzu's "*three treasures*" in Tao Te Ching (Ch. 67).

I have three treasures to hold and cherish,
The first is compassion,
The second is conservation, and
The third is compliance.

Compassion leads to courage,
Conservation leads to generousness, and
Compliance leads to leadership in the world”.

We call it 3Cs Model. The three treasures are the fundamental virtues in Taoism. Compassion is about Caring for and contributing to the thriving and development human societies, it is about charity toward all creatures in the universe. By having compassion, one gains courage. True courage doesn't come from macho posturing or false bravado. Rather, it comes from love and commitment to something greater than oneself. When we apply this principle to business, it requires a business to care for the humanity and quality of life, and engage in actions that appear to further some social good beyond the interests of the firm. Conservation is about being frugal of and protecting the natural resources and environment. Chen, 1989 believes *jian* (conservation) is “organically connected” with the Taoist metaphor *pu* (“uncarved wood; simplicity”), and stands for the economy of nature that does not waste anything. When applied to the moral life it stands for the simplicity of desire. When we apply to business, it requires that business should protect nature and environment by increasing resources efficiency and productivity. Compliance is about being prudent in acting consistently with principles, values and beliefs to avoid the crisis, conflicts and disasters in the process of survival and development of human societies. It implies that being a responsible and sustainable business should not be to reach the minimum requirements of stakeholders but to exceed them in complying with social and environmental rules and standards. It requires a business to monitor and ensure its active compliance with the spirit of the law, ethical standards and international norms. The Laotzu's three treasures could be also called “farmer values”, which are the virtues that Hamel described his parents-in-laws, Ferne and Eldon Findley who built Findley farm successfully and sustainably: *prudence, thrift, self-discipline, and sacrifice* (Hamel, 2012).

All the three treasures are important and must work together. Courage without compassion would be nothing more than brutality. To be abundant and reach widely without conserving one's resources will quickly lead to exhaustion. Forgetting the lesson of compliance or humility, becoming hubris, and letting the ego run wild are the beginning stage of self-delusion. These negative consequences can only lead to failure and doom. Those who hold on to the three treasures can achieve success and sustainability. If business leaders who fight with compassion in their hearts can win in the market competition, because charity and love gives them the strength and power they need. If they fight to defend loved ones or a cherished cause, they achieve security and protection. Because they follow the Tao, Heaven itself will come to their aid, events will seem to conspire in rendering assistance at just the right time, as if they are safeguarded by divine powers. All manners of resources and allies will appear and rally to their cause, in unexpected ways that no one could foresee.

If we interpret it in the business term, compassion is concerned with philanthropic responsibility, conservation with environmental sustainability, and compliance with ethical responsibility. Those who can hold on to the three treasures, they will succeed in achieving sustainability goal. Together compassion, conservation, and compliance provide a solid framework for understanding how these elements work in the pursuit of sustainability. But while each plays a part, it is the collective execution of all three principles that determines the uncommon simplicity and surprising power we seek.

3.3 Emerging Sustainability Risk

Traditionally, when people are talking about business risk, they are more concerned about financial risk, operational risk, security risk or technical risk. But the late twentieth century has shown that any human and business activity can have many consequences on society and natural environment — foreseen and unforeseen,

intended and unintended, beneficial and catastrophic. The companies as they go global have increasingly encountered social and environmental risk. The increasingly significant risks traditionally fall into non-financial areas of business activity, often referred to as environmental, social and governmental (ESG) issues. These risks have been amplified by the butterfly effect in movement of corporate social responsibility, the increasing globalization, new technologies and a rising tide of expectations among stakeholders about the social and environmental role of business. These changes in the operating model have led to a significant shift in market power — not just to customers and traditional investors, but also, more importantly, toward stakeholders. As a result of this shift in market power, “sustainability risk” is a rising area of concern for global corporations. From a company perspective, sustainability risk, like any other risk, arises when its own behaviour or the action of others in its operating environment creates vulnerabilities. In the case of sustainability risk, stakeholders may identify those vulnerabilities and apply pressure on the corporation for behavioural changes. As the ability to listen to corporate stakeholders’ perspectives on social and environmental issues becomes a competitive necessity, managing sustainability risks will need to become more fully embedded in corporate strategy. Experience and case studies demonstrate that the sustainability risks do have financial impacts upon organizations, both positively and negatively. Therefore, it highlighted the need for a review and reappraisal of corporate behaviour and accountability. In turn this had major implications for sustainable risk management. Business leaders must examine new areas of emerging risk and develop sustainable systems of risk analysis and management.

The confluence of risks and opportunities associated with environmental, social and economic performance has made sustainability a strategic priority for companies as part of their overall business strategy. Measuring an organization’s environmental, social and economic performance is often referred to as the “triple bottom line.” Over the past years, we have seen the rising sustainability risks that affect thriving businesses, the environment sustainability, people and the society as a whole. Therefore, sustainability risk management issues have become a critical importance for businesses to be sustainable and competitive in the market. If we look at the pie chart in Figure 1, we can see that the majority of operational risk from sustainability issues is derived from environmental risks, social & ethical issues. As Figure 1 reveals that the primary sustainability risk within the organizations reviewed is still as a result of environmental issues, representing a 5.4% risk to market value; followed by social and ethical issues at 5.1% (including health and safety issues) and economic ‘sustainability’ factors at 2.0% (Spedding, 2008).

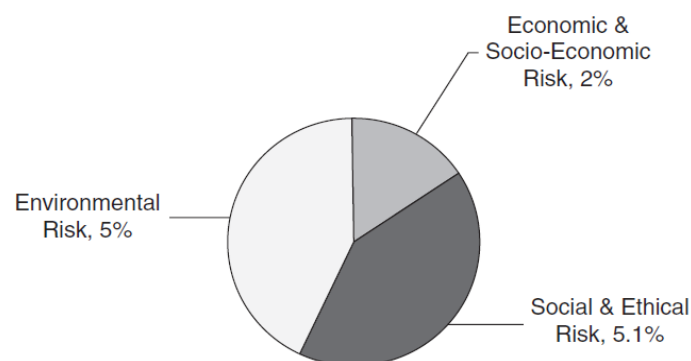


Figure 1 Sustainability Risks

Source: Spedding, Linda, Adam Rose. (2008). *Business Risk Management Handbook: A Sustainable Approach*. Burlington, USA: CIMA Publishing

Table 1 Risk to Value from Sustainability Issues

| Risk to value from sustainability issues | Gross (inherent) risk | Risk management factor (RMF) | Net (residual) risk |
|--|-----------------------|------------------------------|---------------------|
| Economic and socio-economic risk | 2.9% | /1.4 | = 2.0% |
| Social and ethical risk | 9.0% | /1.8 | = 5.1% |
| Environmental risk | 8.2% | /1.55 | = 5.4% |
| Combined risk issues | 20.1% | /1.6 | = 12.5% |

Source: Spedding, Linda, Adam Rose. (2008). *Business Risk Management Handbook: A Sustainable Approach*. Burlington, USA: CIMA Publishing

Table 1 also indicates that among the companies analyzed by the sustainability enterprise management risk rating system (UK, EU and US markets), non-financial issues alone put at risk an amount equivalent to 20.1% of the total market capital if left untreated. This represents the “gross” or “inherent” risk borne by those companies by virtue of the nature of their current operations. The risk management measures actually adopted by those companies are taken into account to mitigate this risk, the sustainability of their risk management systems, and the value threatened falls to 12.5% — a measurement of the ‘net’ risk to market value of the organizations (Spedding, 2008).

Every year, the economists who meet in Davos at the World Economic Forum present an updated estimate of the major risks facing the business world and the global economy. They do this using a grid that shows the two dimensions of risk:

- The likelihood or probability of the risk occurring (expressed as a percentage) and
- The severity or consequences if the risk does occur (expressed in monetary units)

Figure 2 reveals that the risks that are most closely connected to environmental sustainability (climate change, extreme weather events and water scarcity, etc.) are marked in green, and socio-economic issues (income disparity, unemployment and fiscal crises) in red. Sustainability risks (environmental and social risks) have become more prominent over the past years. Many of these risks are interconnected, and a major crisis of one type could trigger a series of related crises, a domino effect (WEF, 2014).

Sustainability risk management deals with emerging environmental and social justice risks. Risk managers will need to anticipate these risks and develop appropriate risk mitigation and strategies for them, but since many sustainability risks are new and emerging, the best strategies for dealing with corporate sustainability might not be apparent. This Chapter will discuss some approaches from perspective of Taoism's philosophy and wisdom, and validate the approaches through the management science and practices in business world.

3.4 Managing Sustainability Risk

3.4.1 Avoiding the Risk: Responding to Early Warning Signals

In an ancient time, Laotzu observed one phenomenon (Ch. 64):

“In handling things, people usually fail when they are about to succeed.”

Today, an American business consultant (Collins & Hansen, 2011) also observed the same one:

“Why do some companies thrive in uncertainty, even chaos, and others do not? When buffeted by tumultuous events, when hit by big, fast-moving forces that we can neither predict nor control, what distinguishes those who perform exceptionally well from those who underperform or worse?”

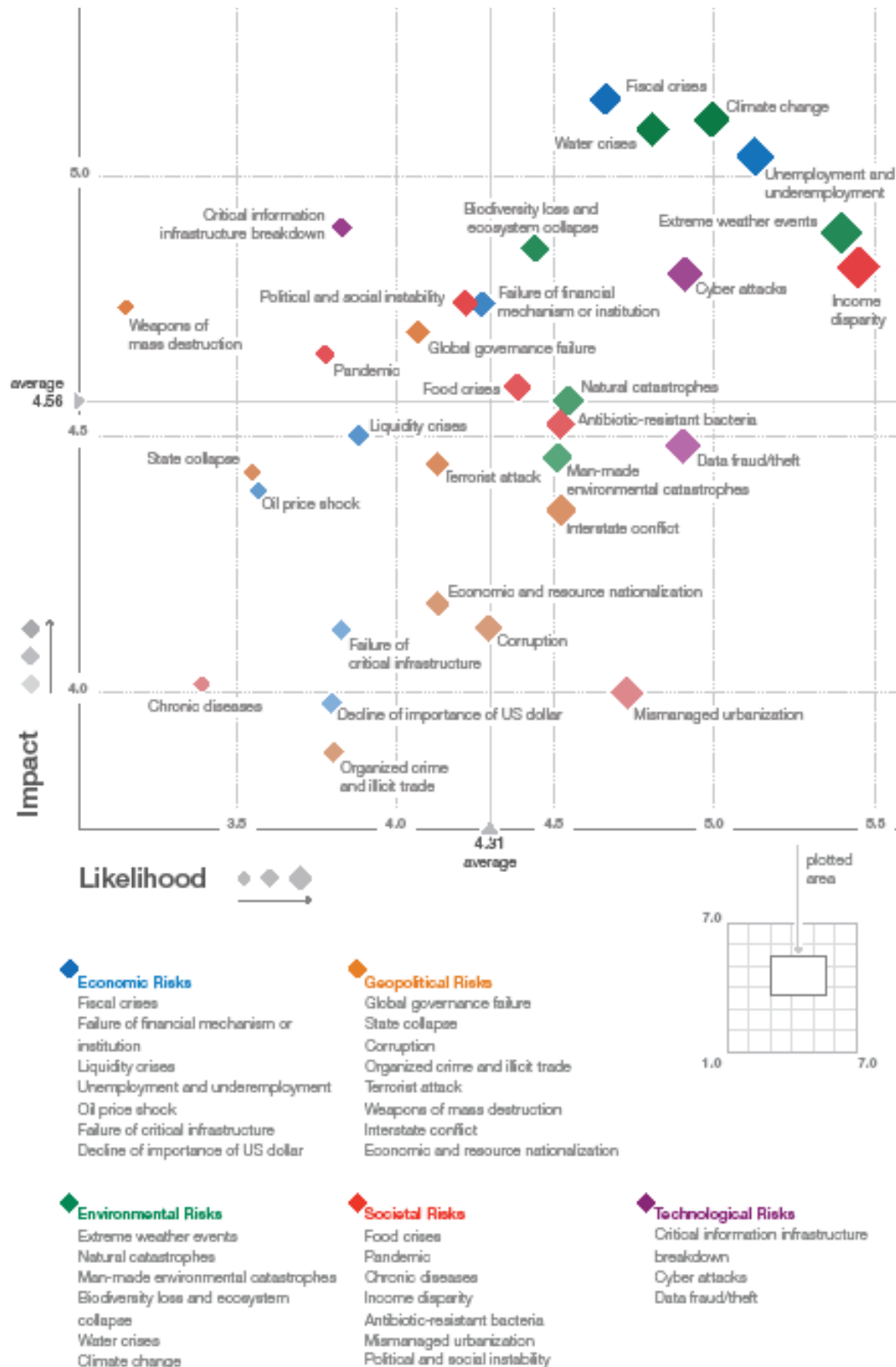


Figure 2 Concern over Sustainability Risks is Growing

Source: World Economic Forum Global Risk Report (2014)

As we discuss the alternation of good luck and bad luck in the preceding section, we understand that there are some dangers or bad luck lurking; namely, past success can lead to both inertia and recklessness. Business success to date can lead to reluctance to change or even risk-aversion behaviour. Contrarily, the same success can breed a sense of invincibility and promote reckless action. O'Neill refers to the latter as the "Icarus Paradox". Icarus is the mythical figure who was overconfident of his own powers and eventually fell back to earth after flying too close to the sun. Early success can promote both inertia and recklessness. Organizations that experience strong performance early in their history tend to become imprinted with change-inhibiting routines, and lead to the hubris. The hubris can take several different forms, ranging from refusing to take competitors seriously to overreacting to moves that might be interpreted as personal attacks (O'Neil, 2002).

In the book of *"How the Mighty Fall"*, Collins examines how and why once great companies have since declined and identifies five stages of organizational decline: hubris born of success; undisciplined pursuit of more; denial of risk & peril; grasping for salvation, and capitalization to irrelevance or death. In the first stage of "hubris born of success", faith and confidence become pride and arrogance. Leaders become careless and workers become complacent. From his analysis, we see hubris in undisciplined leaps into areas where a company cannot become the best, hubris in a company's pursuit of growth beyond what it can deliver with excellence. We see hubris in bold, risky decisions that fly in the face of conflicting or negative evidence. We see hubris in denying even the possibility that the enterprise could be at risk, imperilled by external threats or internal erosion. To avoid the decline and failure, Laotzu advises (Tao Te Ching, Ch. 64):

"Be as prudent at the end as at the beginning,
And there will be no failure."

This can be interpreted profoundly and explicitly by the book of change (or I Ching). The ancient Chinese watched the cycles of the seasons, and comprehended that there also was a cycle of good times and bad times. When favourable situations came to their conclusion, unfavourable situations follow. In the Great Treatise of I Ching, Confucius says (Huang, 2010):

What is danger? It arises when one is satisfied with his security and neglects danger.
What is to perish? It arises when one is satisfied with his survival and neglects death.
What is disorder? It arises when one is satisfied with things in order and neglects disorder.
Therefore the superior person does not forget danger when he is in security, nor does he forget death when he is well, nor does he forget disorder when his affairs are in order.
In this way he gains personal safety and is able to protect the empire.

It implies that in managing risk and crisis in an uncertain world, business leaders shall be precautionous, when the situation is favourable and peaceful, they shall never forget about hard times or potential risk. On the other hand, when the situation is unfavourable, they shall always look forward to the good. This is also the least costly and simplest way to control a potential risk and crisis. Just as Laotzu points out (Tao Te Ching, Ch. 64):

What is stable and peaceful is easy to hold,
What is with no signs is easy to plan,
What is fragile is easy to break,
What is minute is easy to scatter, therefore,
Being well-prepared to risk before it arises,
Being prudent of chaos before it happens

This passage advises acting before anything has happened and setting things in order before confusion arises.

Do not think a mere sprout is not an omen. To act consciously and clutch at things is to court failure. Just as speaking metaphorically of the tree that grows from a slip (Tao Te Ching, Ch. 64):

A huge tree grows from the tiny shoot,
A nine-story high terrace starts from a mound of earth,
A journey of a thousand miles begins under one's feet.

When things are in a quiescent or incipient condition or are undergoing the initial changes, they are easy to deal with. Before the risk or crisis happens, it is easy to control and prevent, so organizations shall develop the risk management system to prevent risk and crisis from happening or leading to the disasters. The frog can't feel the crisis which is going to happen; however, when the water is too hot to stand, it is too late to jump out of water. Thus, business leaders shall anticipate and put the risk management system in place.

In order to be competitive, organizations shall constantly review their methods and models to check they are operating correctly. In addition, they shall examine new areas of emerging risk and develop sustainable systems of risk analysis and management. Business leaders shall maintain hypervigilance and be prudent about any small changes, because it is relatively easy to maintain the situation when everything is peaceful and quiet. When the possibility for chaos is small or nearly non-existent, it is a simple task to keep it in check.

3.4.2 Preparing to Manage the Risk: Maintaining Constant Vigilance

Most business leaders, preoccupied with the market pressures of the present quarter, are not inclined to pay much attention to planning for future risks and crises. Therefore, it is important for business leaders to prepare for that circumstance when prevention doesn't work, that is, making a plan to deal with a variety of undesirable outcomes if disaster does strike. In preparing for the risks and crises, it pays to search for subtleties. It is instructive to recall the principle of Tao (Tao Te Ching, Ch. 63):

Handle the difficult while it is still easy.
Handle the big while it is still small.
Difficult tasks begin with what is easy.
Great accomplishments begin with what is small.
Taking things too lightly results in much difficulty.
Thus the wise always confront difficulties and, therefore have no difficulty.

The passage advises that being successful in planning to handle the risks and crises, business leaders shall make plans against eventual difficulties when things are still easy to resolve, because the difficulties inevitably grow out of easily resolvable troubles. They shall act on what is eventually big while it is still minute, because the big affairs necessarily grow out of minute ones. Only can business leaders who do not act upon things are in the end able to prevent risks and crises and complete their greatness.

Fink (2000), a prominent management consultant has the same opinion, he emphasizes that everyone in a position of authority "should view and plan for the inevitability of a crisis in much the same way [one] views and plans for the inevitability of death and taxes: not out of weakness or fear, but out of the strength that comes from knowing you are prepared to . . . play the hand that fate deals you." (Fink, 2000). His survey of the Fortune 500's CEOs found that senior managers may suffer from a severe lack of crisis preparedness but certainly not from a lack of confidence that they can handle a crisis. 89% of those who responded said that crises in business are as inevitable as death and taxes, yet 50% said they did not have a plan for dealing with crises. Nevertheless, fully 97% felt confident that they would respond well if a crisis occurred (Fink, 2000).

Once leaders know the events, or black swans, they're looking for, they shall set up signal detection

mechanisms, enable open lines of communication and develop responses. These detection notifications can provide faster emergency response and give first mover advantage to changes in the marketplace. As Laotzu suggests (Ch 15):

Cautious, like crossing a frozen stream in winter
Vigilant, like fearful of danger and threats on all sides
Dignified and courteous, like a visiting guest in someone's house
Self-effacing, like ice beginning to melt
Genuine and simple, like a piece of un-carved wood
Open and receptive, like a valley
Freely mixing, like muddy water.
Who can make sense of a muddy world?
Let it be still, and it becomes clear.
Who can remain calm,
And through activity come back to life?
Those who embrace this Tao do not over-extend themselves.
Because they do not over-extend themselves,
They do not wear out and are not replaced.

In their activities, business leaders shall be always “*cautious like crossing a frozen stream in winter*”. Whatever activity and strategy they undertake should be very careful to prevent possible risk and crisis from happening. The leaders shall be “*vigilant, like fearful of danger and threats on all sides*”, because whatever business you do, they always have many competitors, of which, some are good competitors, and others hostile, thus, they must be alert all the time, follow this principle of the Tao. In their behaviour, business leaders must be “*dignified and courteous, like a visiting guest in someone's house*”, this requires them to work with its partners and other stakeholders in responsible and ethical manner. Business leaders must be also “*self-effacing, like ice beginning to melt*”, they shall be patient and clam down, and follow it in a natural way when they face the risk and crisis. The character of business leaders should be “*genuine and simple, like a piece of un-carved wood*”, they shall concentrate on internal risk management, and remain so honest and calm that problems can be solved. When risk and crises happens, the outlook of business leaders should be expansive and their attitudes be open and receptive, as if a deep valley”, they have a big heart just like the valley, so broad and deep that you can defend any disturbance and seductions. The outward expression of business leaders can make them appear *mixed-up as if muddy water*”, they must keep their head open and clear when facing the risk and crisis so that the reputation and image of company won't be damaged by the problems. Only “those who embrace this Tao to take precautions can get rid of risk and crisis, their businesses can be successful and sustainable.

Collins and Hansen (2011) studied companies that rose to greatness-beating their industry indexes by a minimum of ten times over fifteen years (called 10Xers) — in environments characterized by big forces and rapid shifts that leaders could not predict or control. The research team then contrasted these “10X companies” to a carefully selected set of comparison companies that failed to achieve greatness in similarly extreme environments. They found that 10Xers differ from their less successful comparisons in how they maintain hypervigilance in good times as well as bad. Even in calm, clear, positive conditions, 10Xers constantly consider the possibility that events could turn against them at any moment. They believe that conditions will — with 100 percent certainty — turn against them without warning, at some unpredictable point in time, at some highly inconvenient moment. And they'd better be prepared. 10Xers maintain hypervigilance, staying highly attuned to threats and changes in

their environment, even when — especially when — all's going well. They assume conditions will turn against them, at perhaps the worst possible moment. They channel their fear and worry into action, preparing, developing contingency plans, building buffers, and maintaining large margins of safety. 10Xers remain productively paranoid in good times, recognizing that it's what they do before the storm comes that matters most. Since it's impossible to consistently predict specific disruptive events, they systematically build buffers and shock absorbers for dealing with unexpected events. They put in place their extra oxygen canisters long before they're hit with a storm.

3.4.3 Recognizing and Containing the Risk

There is a Chinese proverb, saying that “a dike ten thousand feet long begins its crumbling with holes made by ants; and a room one hundred feet square begins its burning with sparks of fire leaping through cracks of chimneys.” Why did the disasters happen? They didn't act in accordance with the principle of the Tao: “*Being well prepared for risk before it rises, being prudent about chaos before it happens (Tao Te Ching, Ch.64).*” In other words, it is always easier to act on something effectively when it is small. Take care of an issue as early as possible, before it really becomes an issue. Nip a potential problem in the bud so it doesn't get the chance to grow into something serious. “A lot of crises seem to happen overnight, but they have really long roots, like ten to fifteen years in terms of the source of the real problems.” This is what Xerox CEO Anne Mulcahy said when she visited Harvard Business School class (George, 2009).

We have also seen that there is a risk, business leaders refuse to face reality, and thus they often fail to see the crisis coming. Rather than acknowledging they should have recognized the signals in time, they blame external events and things outside their control. Companies sometimes misclassify a problem, focusing on the technical aspects and ignoring issues of perception. But it is often the public perception that causes the risks and crises.

Collins (2009) illustrates the story of his wife who suffered breast cancer in his book: *How the Mighty Fall: And Why Some Companies Never Give In*. He described that his wife looked like the picture of health, but she had already been carrying the carcinoma. The image of his wife, looking healthy yet already sick, stuck in his mind and gave him a metaphor. He's come to see institutional decline like a staged disease: *harder to detect but easier to cure in the early stages, easier to detect but harder to cure in the later stages*. An institution can look strong on the outside but already be sick on the inside, dangerously on the cusp of a precipitous fall. Machiavelli (2003) also has the same point of view in his book “*The Prince*”: “If they be foreseen while yet remote, admit of easy remedy, but if their approach be awaited, are already past cure, the disorder having become hopeless; realizing what the physicians tell us of hectic fever, that in its beginning it is easy to cure, but hard to recognize; whereas, after a time, not having been detected and treated at the first, it becomes easy to recognize but impossible to cure.”

China has the same thought-provoking story in the ancient time which can illustrate the problem. Bian Que was a well-known herbalist doctor in the Spring-Autumn & Warring States periods in ancient China. Once he went to visit Lord Huan of Cai. He observed him for a while and said, “Now your disease is at the surface of your skin. It will get serious if you do not cure it.” But Lord Huan of Cai said, “I have no disease.” After Bian Que went out, the Lord said to the people beside him, “It is a common fault for a doctor to cure those who are not ill. And finally he would claim the credit for himself!” Ten days later, Bian Que came to visit Lord Huan again. After careful observation, he said, “Your disease has reached your muscle. If you do not cure it now, it will get worse!” Lord Huan still did not pay any attention to his words and was very unhappy. Another ten days later, Bian Que said to Lord Huan, “Your disease is now in the digestive system. It would be even worse without curing!” Lord Huan again refused to take his advice and was unhappier. Another ten days later, as soon as Bian Que saw Lord

Huan, he left without saying anything. Lord Huan was curious and sent someone to ask Bian Que why. Bian Que said to the messenger, “When the disease was at the skin, in the muscle or in the digestive system, I am able to cure it. But now it is deep in the marrow and no one can cure it.” Five days later, Lord Huan felt pain in his body and sent messengers to look for Bian Que, but Bian Que had escaped to the State of Qin. Soon after that, Lord Huan died of illness.

All the three stories have the same implication for a business leader when they manage risk. A business leader shall be like a good physician, when treating diseases, attacks them when they are still in the capillary tubes. This means that they manage risk when it is small. Hence, the saintly man begins to attend to things when it is early enough. In our daily life and as well as business world, we should not overlook small defects because small problems may bring about disasters in the future. If you want to achieve success, you have to start out small. It also holds true for solving difficulties and risks. If you only focus on the disappointing trouble as a whole, you will lose heart.

Sanlu's melamine scandal in China is the case for illustrating the above problems. On 12 September 2008, the Chinese government ordered the nation's biggest manufacturer of milk powder, Sanlu Group, to halt production because its powdered infant formula was found to contain melamine, a nitrogen-rich chemical, ingestion of which could cause kidney stones. The national inspection agency further discovered that milk products manufactured by 21 other dairy companies tested positive for melamine. Sanlu was reported to have received its first complaint of illness as early as December 2007. However, news of the problem only surfaced nationwide after Sanlu's New Zealand partner, Fonterra Cooperative Group, alerted the New Zealand government in September 2008.

Sanlu received the first complaint about its melamine-laced milk power as far back as December 2007. The first documented exposure of Sanlu's problematic powder was posted on a popular internet community by a consumer. Most of the other Sanlu milk contamination cases were found in Hebei, Jiangsu and Gansu provinces. About three months before the milk scandal leaked in September 2008, a local newspaper in Jiangsu had reported a rising number of babies diagnosed with kidney disease over the previous two months. Around the same period of time, the health department in Gansu also received a report from a local hospital in mid-July indicating a surge in cases of kidney ailments among babies, stating that most of the affected had been drinking Sanlu's infant formula. However, soon after the scandal broke, Sanlu apologized publicly for the incident, but denied about the urgency and severity of the challenges they were facing, and blamed external suppliers for their problems, for example, Sanlu said that its milk suppliers had added melamine to the milk before selling it to them. The company failed to explain the delay in alerting the public to the contamination. The local government of Shijiazhuang, where Sanlu was headquartered, was also blamed for holding back the news from the central government. By the end of September 2008, about 53,000 young children were found to have been sickened due to consumption of melamine-laced dairy products, and at least four babies had died from kidney failure. The melamine scare resulted in many countries recalling and banning goods using milk products from China. The milk crisis was soon regarded by the World Health Organization as one of the largest food-safety events in recent decades.

3.4.4 Strategy for Responding to Sustainability Risk

In today's socially conscious environment, companies are exposed to scrutiny of stakeholders in social and environmental issues. Risks tied to perceptions of over-consumption of water and reputational risks linked to investments in projects with potentially damaging environmental consequences. Additional trends in sustainability risk include risks to financial performance from volatile energy prices, compliance risks triggered by new carbon

regulations, risks from product substitution as customers switch to more sustainable alternatives, and risks associated with the way in which a company and its staff conduct themselves including matters such as culture, tone from the top, governance, how customers are treated, remuneration of staff and how companies deal with conflicts of interest. Therefore, companies are increasingly confronting the risks and crises emerging from corporate social responsibility and sustainability issues.

A business finds itself being criticized for some action it has taken or failed to take. The stakeholders and civil society have the power in exerting enormous pressure on businesses, and wielding significant influence on public opinion, causing firms to take or not take particular courses of action. Stakeholders need a quick response with information about how the company plans to resolve the risk and crises, as well as what they can do to mitigate negative effects to themselves. It is necessary to communicate specific issues to stakeholder groups, including remorse for the event, guidelines as to how the organization is going to address the crisis, and criteria regarding how stakeholder groups will be compensated for negative effects.

What strategies does a company take to respond to them leads to different consequences when the social and sustainable risks and crises emerge? Some researchers have identified some strategies that business response to risks and crises. They are the reactive (or obstructionist), defensive-accommodative and proactive (Carroll, 2008). The reactive strategy involves denying responsibility and doing less than is required. The defensive strategy acknowledges only reluctantly and partially the responsibility issues that may be raised by the firm's stakeholders. The accommodative strategy attempts to satisfy stakeholder demands and the proactive accepts and anticipates stakeholder interests. Few leaders are willing to accept responsibility for their mistakes. Instead, many ignore problems and hope they go away. Most of business leaders take reactive (obstructionist), defensive strategies instead of accommodative and proactive. They often go into denial about the urgency and severity of the challenges they are facing. Or they tend to blame external events, people, or organizations for their problems. Without accepting that the problem is theirs to fix, they cannot understand what they are dealing with. Often the hardest part is to acknowledge their role in the origins of the crisis. Even when leaders acknowledge their responsibility, they may face significant resistance from their organizations in solving it because people have great difficulty in admitting their mistakes (Geogore, 2009).

One of most important principles of Tao is softness and pliancy like water and feminine, and therefore, Laotzu suggests a softer stance so as to reduce or avoid risks and crises, that is accommodative and proactive stances. Laotzu says (Ch.78)

Nothing in the world is softer than water
Yet nothing is better at overcoming the hard and strong
This is because nothing can replace it
That the weak overcomes the strong
And the soft overcomes the hard

Water appears to be the weakest and softest thing in the world, and is the ultimate symbol of the yielding and flexible aspect of the Tao. At the same time, there is also nothing better than water at dissolving the hardest and most unyielding rocks. This observation of water teaches us that despite a yielding, humble appearance, the weak overcomes the strong and the soft overcomes the hard. This is a principle that we can all understand, but somehow cannot put into practice in real life. We still have a tendency to meet force with force. Business leaders can learn from this wisdom that those who have the strength to accept problems and crises, they can possess the power embodied in water — seemingly soft and weak, and yet able to overcome the hard and strong. If they apply this

power to business, they would achieve competitive advantage in the business world. Therefore, by embracing the seemingly weak and soft, a business leader can gain personal power to overcome risks and crises and achieve sustainable development.

However, if business leaders take the opposite stance, like obstructionist and defensive stances, they will bring about failure and calamity. Laotzu always opposes these actions. He warns that:

The stiff and hard are companions of death,
And the tender and supple are companions of life.
The strong army does not win, a stiff tree shall break.
The hard and strong have disadvantage and shall fall, while
The tender and supple have advantage and shall live

Life is characterized by softness and pliancy, while death is characterized by stiffness and rigidity, just like our body and trees. We can generalize from this observation and link death to that which is hard and unyielding. Life would be linked that which is pliable and thus capable of growth and adaptation. This applies not only to flora and fauna but also to all aspects of human existence. For instance, an army that cannot adapt to the ever-changing conditions on the battle field will soon find itself out-manuevered and defeated by an enemy that is more nimble and flexible. This implies for business leaders who are forceful and aggressive may seem to have the upper hand, but in fact occupies a lower position of disadvantage. Conversely, being yielding and flexible may be perceived as a weakness, but is in fact a great strength that occupies a higher position leading to victory and success.

The risk and crisis is not going to fix itself, so denying its existence can only make things worse. That reality must start with you and your acknowledgment of your role in the crisis itself. Then you have to guide your organization to face reality as well. Bryant (2009) who lived as a homeless person early in his life, is the founder of Operation HOPE. He has raised \$500 million to focus on financial literacy for the poor and serves as vice chair of the President's Council on Financial Literacy. In *Love Leadership*, Bryant writes, "Vulnerability is power", he says:

"Admitting weaknesses and owning up to mistakes have counterintuitive benefits. When you are honest, people are more likely to forgive your any weaknesses and mistakes. You are also able to make a stronger connection with others. That ultimately gives you an ability to persuade and influence people, which in turn strengthen your ability to lead."

Laotzu has the same opinion (Tao Te Ching, Ch. 73)

Those who are courageous in daring bold shall be killed,
Those who are courageous in not daring shall survive.
...
The best leader,
Does not contend, yet, he wins easily,
Does not speak, yet he gets a good response,
Does not demand, yet, all needs are met.

This passage implies that those who possess courageous resolve but advance with caution are congruent with the Tao, and that is why they seem to be favoured by the heavenly powers. The lesson for business leaders is that they shall know the distinction between courage and daring. Courage means being resolute, dauntless and firm; daring means throwing caution to the winds, full speed ahead and damn the torpedoes. One is an inner quality born of conviction; the other is an external display of bravado. Therefore, business leaders who possess this inner

quality are similar to the Tao in the following ways:

- Because they are unadventurous, they do not struggle against others, just as the Tao contends against no one. But despite this seemingly yielding nature, they consistently achieve their objectives in the long run.
- They are quiet and unassuming, just as the Tao does not speak. However, they remain ever responsive to changing conditions out of their sense of caution. When circumstances change, they are ready to alter their approach to better aim for a moving target.
- They are also fully present in all of their activities, just as the Tao is present in all things. They bring mindfulness to their work. By being totally aware in each moment of life, they enhance and deepen everything they do.
- They are composed and prepared, just as the Tao plans and coordinates its myriad movements in a relaxed and unhurried way. They see how flowers bloom when the season is right and not a moment sooner, so they also take their time in thoughtful planning. By being well-prepared, they are able to act with composure and maximize their chances of success... when the time is right, and not a moment sooner.

Thus, it is exactly that only because he does not contend, no one is able to struggle with him. Compliance means fortune, and opposition means misfortune. That's why he excels in making people respond without speaking. He takes a low position, the people gravitates to him naturally. Heaven reveals good fortune and misfortune by hanging down the images in the sky, and the plan he sets are verified before things actually happen. While security, he does not forget the threat of danger, and makes plans while things are still in the pre-manifest stage. Therefore, Laotzu says (Tao Te Ching, Ch. 81)

True words are not beautiful,
Beautiful words are not true.
The good do not argue,
Those who argue are not good.

We want to examine the two business cases to illustrate the different responsiveness strategies and consequences. The first example is about the organizational denial which can be found in the difficulties pharmaceutical maker Merck. Merck had with its \$2.5 billion pain-relief drug, Vioxx. After an intense battle with Merck over indications of cardiovascular effects from the drug, the FDA approved Vioxx for general marketing in 1999. As large numbers of patients began using the drug and additional studies were completed, concerns continued to arise about Vioxx's safety for cardiovascular patients. Skeptical because the concerns were based on nonrandomized data, Merck executives decided to conduct a three year randomized trial of high-risk cardiovascular patients while continuing to market the drug. In September 2004, Merck halted the study at the midway point because results showed Vioxx patients were twice as likely to suffer a heart attack or stroke as those on placebo. Merck CEO Ray Gilmartin courageously pulled the drug from the worldwide market for all users, not just those at high risk of cardiovascular disease. By then Vioxx was linked to more than twenty-seven thousand heart attacks and sudden cardiac deaths and a rising flood of lawsuits from plaintiff's attorneys. Merck wisely chose to defend Vioxx on a case-by-case basis, which may have saved the company from insolvency. After three years of fighting the attorneys to a draw, Merck announced a \$5 billion settlement with the plaintiffs in 2007. The company had finally put its agony behind it. Why did Merck, a company known for its scientific prowess, not take the more conservative course of restricting access to Vioxx? From the outside, it appears that Merck was so committed to using Vioxx to compete in the pain-relief market with Celebrex and other painkillers that it waited

until proof was in from its own scientific study. When the study confirmed the problem, management immediately took action. By then, the damage was done.

Denying reality has destroyed more careers and organizations than incompetence ever did. The first reason is that people always prefer good news or a quick fix. Rarely are they willing to acknowledge that their organization is facing a crisis. Crises often start out in relatively benign ways, and then seemingly minor events escalate into major ones. Unless leaders face reality early, they can easily miss the signals of the deeper crisis that is waiting ahead. Until its leaders acknowledge the crisis, their organizations cannot address the difficulties (Geogore, 2009). Many people find reality is just too horrible to face or they are too ashamed, so denial becomes a convenient defence mechanism. If you feel yourself getting defensive, ask yourself, "What am I defending against? How might denying reality make the situation worse?"

The second case is about the proactive responsiveness of Amgen. In 2007 Amgen, the world's largest biotechnology company faced growing safety concerns over Aranesp, its highly successful anaemia drug with \$4 billion in annual sales. After six years on the market, a series of studies conducted by Amgen, Johnson & Johnson, and others revealed problems with off-label use of Aranesp. To deal with the growing crisis, CEO Kevin Sharer tasked his key executives with developing a plan to address the problems. But he found they wouldn't move until he acknowledged his own role in the crisis. "For a deeply reflective hour, I asked myself what I owned of this problem. I came up with a long list," said Sharer.

When he met with the executives to go over his list, they were stunned that their CEO would admit his errors. This freed them up to address their roles in the crisis and take necessary actions to get out of it. Well aware of the Merck experience with Vioxx, Amgen voluntarily agreed to more restrictive language on Aranesp package inserts. As a result, sales dropped by 26 percent, or more than \$1 billion, but the company recovered. Aranesp is still on the market, albeit with a reduced patient population, and Amgen's relationship with the FDA is healthy once again.

Reflecting on what he learned from this crisis, Sharer noted, "The toughest thing was to embrace the reality that we had to take action because so many stakeholders had questions about the safety of Aranesp."

Our first reaction was to blame these problems on the FDA. We had to get above the fray and recognize that public health officials had legitimate questions about what was happening. First, I had to acknowledge my role in the crisis. Then we could face reality together by owning the problem and looking realistically at the decisions we had made.

Sharer stresses the importance of being adaptive to new realities in a crisis. He notes that many CEOs fail to adapt because they get stuck in a comfortable mind-set with their version of reality. He cites his favourite analogy from biology: "What species survives? The biggest? The strongest? The fastest? No, it's the most adaptive." (George, 2009).

4. Conclusion: Risk Management, Competiveness and Sustainability

A responsible and sustainable business in an uncertain world shall be prudent to any threats of risks and crises, particularly be concerned about the social and environmental issues and emerging national and global regulations. Laotzu offers us the roadmap for business to achieve a competitive advantage and sustainable goal. He emphasizes in Tao Te Ching (Ch. 59):

Those who lead the organization, just like caring for their body,

Shall be prudent in conservation
To be prudent is to be well prepared from the beginning.
To be well prepared from the beginning is to build up virtues.
By building up virtues, nothing is impossible to be conquered.
When nothing is impossible to be conquered, one gains unlimited capacity.
Those who have unlimited capacity can lead the organization.
Those who hold on to this principle and value of conservation,
Shall govern the organization sustainably,
Being built on the firm foundation,
The organization shall be grown and sustained.

This passage describes the sustainability roadmap for business leaders: to be a sustainable company, Laotzu claims that people shall be prudent in conservation, valuing and using natural resources efficiently, and caring for environment. In doing so, business leaders must be well prepared at the early stage and be precautious of what they are doing. Thus when risk and crisis arises, they are well prepared to avoid and solve it. One of the important measures to avoid and solve risk and crisis is to build up virtues, i.e. doing business in socially responsible way, this can win in the competitive market, and therefore, thus, business leaders have the capacity of leading the people and governing organization. To thrive and sustain their organizations, they must hold on to the principle of the Tao (the Way and Virtue). When it comes to serving the society and protecting natural resources and environment, there is nothing like the principle of conservation — the principle of valuing and using natural resources efficiently and caring for environment. The best way to conserve the resources is to be prudent and well prepared for risk and crisis in an uncertain environment. It is in business leader's responsibility to give up any business activities which can consume too many resources and deteriorate environment as soon as possible. Over-consuming resources and damaging environment can bring risk and crisis to the organization and society as a whole. The sooner business leaders stop wasting resources and energy in environment, the sooner they can start accumulating virtues — social and environmental values — in their organization.

When they accumulate virtues by holding on to social and environmental responsibility, business leaders can become powerful and competitive, and there are no obstacles they cannot overcome. Once they move beyond the limits that hamper most people, business leaders can gain power over themselves, as well as a natural authority that people respond to. They are able to influence them effortlessly because their respect for them flows naturally. This is the mother principle of true authority. Unlike the transient power achieved through force or domination, it is a positive force that lasts. With this lasting power, business leaders will have a firm foundation upon which to build harmonious and enduring society. This positive force takes root deeply in the hearts of people and also in business leaders. It is the Tao of sustainability — a vision of everlasting harmony and leadership: embedding sustainability into the organization's risk management strategy offers an opportunity to increase the effectiveness of risk management practices, improve business performance, and achieve competitive advantage.

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Impact of Financial Reporting on Access to Capital

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Abstract: This paper examines the influence of financial reporting and the enforcement of accounting standards on financing opportunities through cross country analyses based on data published in the Global Competitiveness Index by the World Economic Forum. Consistent with our expectations, battery of tests illustrate that countries with robust financial reporting practices and adequate accounting enforcement, particularly indicated by the strength of reporting and auditing standards and regulation of stock exchanges, tend to have more developed securities exchanges and are capable to easily access various forms of financing, such as loans and venture capital. However, our results indicate that equity capital, particularly stock market financing, is most sensitive to financial reporting. We conclude our research by descriptively analyzing financial reporting patterns for joint stock companies listed on the Georgian Stock Exchange.

Key words: financial reporting; accounting standards; assurance; securities regulation; Georgian joint stock companies

JEL codes: M40, D82, G10

1. Introduction

Access to capital plays an important role in the development of each economy (Bruhn & Love, 2014). For instance, if companies do not have access to pertinent sources of equity financing, they would naturally fulfill their financing needs through debt, which cannot ensure sustainability of their development. The above-mentioned tendency is more pervasive in developing nations, where high interest rates can be a significant burden for firms' operations. Besides, many companies in developing nations find it difficult to obtain loans because of the absence of collateral assets (Dong & Men, 2014).

According to the Organization of Economic Cooperation and Development (OECD), Georgia ranks higher than most European Economic and Social Committee (EESC) countries in categories such as low administrative barriers to entrepreneurship and business friendly customs and tax legislation (OECD, 2011, p. 69). However, having business friendly legislation and reduced "red tape" does not translate for Georgia into higher ranks in terms of financial market development and access to Foreign Direct Investments (FDI) (OECD, 2011, pp. 69-70). In fact, access to financing is proclaimed to be the biggest challenge for doing business in Georgia (p. 69).

There are various explanations of why companies in developing countries like Georgia have problems

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accessing finance, particularly equity financing. Some say that biggest obstacles to access to equity capital are the lack of development of investment funds and angel networks, “a reluctance of the business owners to dilute ownership, few innovative fast-growing enterprises and reduced possibilities for an exit strategy” (OECD, 2011, p. 147). However, the importance of financial reporting and enforcement of accounting regulations in hindering the development of equity markets should not be underestimated. This research shows the influence of financial reporting on access to capital first by cross-country analyses and then by examining the situation in Georgia.

Gao and Zhu researched the relationship between “information asymmetry, capital structure and the cost of capital across countries, particularly focusing on how the relationship is influenced by the various aspects of institutional environment. Results show that firms with more informational asymmetries tend to use more debt capital but less long-term debt possibly because of the differential impact of information asymmetry on the cost of different types of capital” (Gao & Zhu, 2013). In Gao’s and Zhu’s work is partially based on Myers’ and Majluf’s findings in the sense that according to their pecking order theory, equity capital is more sensitive to informational asymmetry than debt capital (Myers & Majluf, 1984). Gao’s and Zhu’s view of Myers’ and Majluf’s theory, “outside investors would require a higher adverse selection risk premium on equity than on debt and firms with intense information asymmetry would borrow more and end up with high leverage” (Gao & Zhu, 2013).

In order to assess institutional factors that influence financial reporting quality in different countries, Gao and Zhu examined issues such as enforcement of accounting standards and found that enforcement reduces informational asymmetry levels, which in turn improves access to capital for companies (Gao & Zhu, 2013). Furthermore, Naranjo, Saavedra and Verdi investigated the relationship between mandatory International Financial Reporting Standards (IFRS) implementation and financing decisions and they concluded that mandatory IFRS reporting promotes access to international equity capital (Naranjo, Saavedra, & Verdi, 2014). One of the biggest findings of above mentioned research papers is that countries with strong disclosure practices and vigorous enforcement of accounting standards tend to have lower levels of informational asymmetry, which in turn reduces investors’ adverse selection risk and increases companies’ capital structure adequacy.

It is important to note that accounting standards implementation only matters in countries that have ways to ensure standards’ enforcement. DeFond, Hu Hung and Li studied the implementation of IFRS in European Union (EU) countries in the context of foreign mutual fund investments and concluded that foreign mutual fund investment flows increased only in countries with implementation credibility as opposed to countries that lack adequate enforcement measures (DeFond, Hu, Hung, & Li, 2011). Therefore, accounting standards implementation itself does not improve access to equity if an implementing country does not have strong enforcement mechanism in place.

As an example of a developing country that has issues with informational asymmetry, Georgia’s lack of development in terms of accounting and auditing standards has been outlined by the World Bank in its Reports on the Observance of Standards and Codes (ROSC) both in 2007 and 2015. According to the World Bank, “the Georgian capital market remains rather shallow and dormant, with the banking sector dominating the financial sector. Georgian banks tend to give very little value to proper financial reports furnished by potential and existing borrowers, mainly relying on loan collateral. Collateralization requirements in Georgia averaged 222% of the loan values, and are partially caused by the lack of credibility and transparency of the financial information presented by borrowers.” These statements support the assertion that efficient financial reporting and adequate enforcement of accounting standards promote the development of country’s finance sector.

One of the main sources of equity financing in most countries is local equity market. The Georgian Stock

Exchange (GSE) was established in 1999 by the Law on Securities Market, which aims to “develop securities market in Georgia, to protect foreign investors’ interests, to ensure transparency of information during the initial public offerings by the issuers, as well as their subsequent trading and to establish fair rules and healthy competition in dealing securities” (The Parliament of Georgia, 1999). Article 9, paragraph 1 of the above mentioned law defines Reporting Entity as “a legal entity founded pursuant to the Law of Entrepreneurship of Georgia and that has issued securities”. The paragraph 3 also gives authority to the National Bank of Georgia (NBG), the regulator, to free certain entities from reporting responsibilities if the regulator determines that such an action would be in public interest. This, in essence, enables NBG to grant special treatment to certain companies.

Article 11, paragraph 1 of the above mentioned law states that reporting entities are obliged to prepare and submit to the NBG the following reports: annual financial report, semi-annual financial report and current report. Paragraph 2 of the same article defines annual financial report in the following manner: annual report is prepared annually and it must contain information regarding the issuer, its business, governing bodies and those individuals who own or control significant voting shares, audited IFRS financial statements and any other information requested by the regulator. Annual financial report must be submitted to the NBG no later than May 15th of the following year. Semi-annual financial report must be submitted to the NBG by August 15th of each year.

Notably, before 2007 Article 18, paragraph 1 of the Law on Securities Market provided that all secondary market transactions should take place on GSE. Exceptions could be made only if transparency, liquidity and competitiveness rules were not violated. In 2007, changes have been made to the Article 18, paragraph 1, which currently reads as follows: “the issuer’s securities on the secondary market may be traded either on the stock exchange or outside of the stock exchange” (The Parliament of Georgia, 1999). This enabled secondary market transaction to take place “over the counter” to avoid stock market regulations.

In the midst of the Great Recession, OTC trades have also come under scrutiny in the United States and the rest of the world. During the US Senate hearing in 2009, it was basically a consensus that OTC derivative products were essentially toxic and promoted the development of the financial crisis. According to one US Senator, “it is not clear that all derivative products are genuine hedges or accurately priced. In fact, some look a lot more like a way to get around regulations and proper risk management, or just plain gambling” (Committee on Banking, Housing, and Urban Affairs. Subcommittee on Securities, Insurance, and Investment, 2009, p. 3). Therefore, the Georgian securities law amendment, which enabled OTC trading on most securities should be viewed with caution.

The above mentioned law on securities market authorizes the NBG to regulate the GSE. Paradoxically, it does require the regulator to make issuers’ financial statements public in order to uphold public interest. This tendency is certainly not in line with international best practice in the sense that the primary function of such regulators in developed countries (for instance, the Securities and Exchange Commission in the United States or Prudential Regulation Authority in the United Kingdom) is to ensure that investors receive pertinent information in order to make informed decisions. Furthermore, researchers such as Cattaneo, Meoli and Vismara argue that vigorous disclosure requirements are essential to improving IPO survival chances (Cattaneo, Meoli, & Vismara, 2015).

The World Bank also highlighted the fact that “Most regulatory agencies lack technical expertise and human resources to properly execute their supervisory functions” (The World Bank, 2014, p. 7). More specifically, the World Bank’s report states that “different regulators have different approaches towards standards implementation and the required level of compliance, leaving gaps in enforcement and monitoring. The mandatory

implementation of IFRS by regulated entities remains a challenge at present” (p. 7). Furthermore, the report also indicates that there is very limited access to companies’ financial statements publicly, which one could argue is a result of regulators’ incompetence (p. 8).

2. Research Methods

During the first stage of the research, this paper analyzes the impact of the development of financial reporting and auditing standards on countries’ financial development similarly to Naranjo’s Saavedra’s, Verdi’s, Modi’s and Taylor’s approach. The research was conducted as cross country analyses based on the data from Global Competitiveness Report of 2014-2015 by the World Economic Forum. IBM SPSS software was used to conduct parametric statistical tests.

The Global Competitiveness Report of 2014-2015 ranks 144 countries of the world on a scale of 1 (worst) to 7 (best) based on various economic and development characteristics. The report contains 12 co-called pillars ranging from infrastructure development to business sophistication and innovation. Countries’ rankings differ based on various pillars and their sub-categories: for instance, Georgia is ranked 7th in the burden of customs procedures category with a value of 5.56 and 105th in the intensity of local competition with a value of 4.64.

First, this research compared the rankings of 144 countries in terms of the strength of auditing and reporting standards (pillar 1) and financing through local equity market (pillar 8), using parametric statistical tests in order to ascertain the impact of the financial reporting and auditing development on the access to local equity capital. In other words, the variable from pillar 1 titled “Institutions” is compared to the variable from pillar 8 titled “Financial market development” to test whether strong institutional factors related to the quality of financial reporting and the enforcement of accounting regulations (audit) influence access to equity throughout the world. This is based on the assertion that high quality institutions are critical for access to financing (Öztekin, 2015).

According to the Table 1, strength of auditing and reporting standards range from 2.2 to 6.7 with a standard deviation of 0.92. Libya is the country with lowest ranking in this category, whereas South Africa has the highest mark. Georgia has a value of 4.39 in this variable, which is below the mean of 4.63. On the other hand, financing through local equity market ranges from 1.42 to 5.7 with a standard deviation of 0.95. Angola is the country with the lowest value, whereas Hong Kong has the highest mark. Georgia has a value of 2.24 in this category, which is less than the mean of 3.4 by more than one standard deviation.

The research design consists of ascertaining the distribution’s normality and homogeneity of variance before carrying out parametric statistical tests, which include examining both association between the variables through correlation, as well as studying the cause and effect relationships using regression analysis.

Table 1 Descriptive Statistics: Strength of Auditing and Reporting Standards and Financing through Local Equity Market

| Descriptive Statistics | | | | | |
|--|-----|----------|----------|------------|----------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| Strength of auditing and reporting standards, 1-7 (best) | 144 | 2.204065 | 6.701453 | 4.63032356 | 0.919903426 |
| Financing through local equity market, 1-7 (best) | 144 | 1.424694 | 5.698652 | 3.40660614 | 0.953144701 |
| Valid N (listwise) | 144 | | | | |

Before conducting parametric statistical tests, normality of distribution of above mentioned variables were examined by Kolmogorov-Smirnov and Shapiro-Wilk tests (see Table 2) and concluded that both strength of auditing and reporting standards (SW = 0.991, p = 0.510) and financing through local equity market (SW = 0.987,

$p = 0.218$) are normally distributed variables. The results in Table 2 indicate that both the strength of auditing and reporting standards and financing through local equity market variables are normally distributed.

Table 2 Test of Normality of Strength of Auditing and Reporting Standards and Financing through Local Equity Market

| Tests of Normality | | | | | | |
|--|---------------------------------|-----|--------|--------------|-----|-------|
| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Strength of auditing and reporting standards, 1-7 (best) | 0.043 | 144 | 0.200* | 0.991 | 144 | 0.510 |
| Financing through local equity market, 1-7 (best) | 0.046 | 144 | 0.200* | 0.987 | 144 | 0.218 |

Note: *. This is a lower bound of the true significance; a. Lilliefors Significance Correction.

In addition to ascertaining the normality of distribution, examination of homogeneity of variances is portrayed by the Figure 1, which makes it evident that variances of the strength of auditing and reporting standards and financing through local equity market variables are homogeneous. As one can see graphically, variances are of approximately equal size.

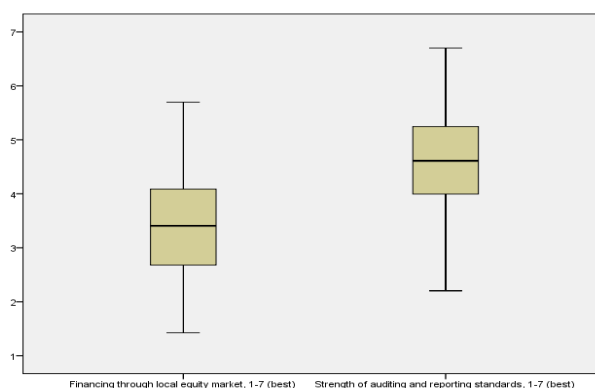


Figure 1 Homogeneity of Variances

The next step of the research process is to test if there is a correlation between the two variables. Table 3 illustrates that Pearson's correlation coefficient between the strength of auditing and reporting standards and financing through local equity market is 0.759, which is a robust correlation coefficient. Additionally, this correlation coefficient is statistically significant ($p = 0.000$). In our judgment, correlation coefficient of 0.759 shows a strong association between the above-mentioned variables.

Table 3 Correlation: Auditing and Reporting and Financing through Equity Market

| Correlations | | | |
|--|---------------------|--|---|
| | | Strength of auditing and reporting standards, 1-7 (best) | Financing through local equity market, 1-7 (best) |
| Strength of auditing and reporting standards, 1-7 (best) | Pearson Correlation | 1 | 0.759** |
| | Sig. (2-tailed) | | 0.000 |
| | N | 144 | 144 |
| Financing through local equity market, 1-7 (best) | Pearson Correlation | 0.759** | 1 |
| | Sig. (2-tailed) | 0.000 | |
| | N | 144 | 144 |

Note: **. Correlation is significant at the 0.01 level (2-tailed).

Although there is statistical significant correlation between the above mentioned variables, it is important to examine the cause and effect relationship by conducting regression analysis, where the strength of auditing and reporting standards is an independent variable (x) and financing through local equity market — a dependent variable (y). Table 4 shows the result of regressions analysis: adjusted R square equals 0.573, which means that roughly 57.3% of the success of financing through local equity market is due to the strength of countries' auditing and reporting standards. Appendix I illustrates that regression coefficient of 0.573 is statistically significant ($p = 0.000$). Considering that regression analysis indicated that financing through local equity markets are influenced by more than 50% by the strength of auditing and reporting standards, one could argue that financial reporting and accounting enforcement are biggest determinants of local equity market financing.

Table 4 Regression Analysis

| Model Summary ^b | | | | |
|----------------------------|--------------------|----------|-------------------|----------------------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | 0.759 ^a | 0.576 | 0.573 | 0.623021306 |

Note: a. Predictors: (Constant), Strength of auditing and reporting standards, 1-7 (best);

b. Dependent Variable: Financing through local equity market, 1-7 (best).

The strength of auditing and reporting standards was also analyzed in the context of ease of access to loans, venture capital availability and financial market development. Appendix II lists general descriptive statistics of the last three variables. In all three cases, Georgia ranks below average with almost one standard deviation less than the mean. Shapiro-Wilk test was used to check the normality of distribution of the ease of access to loans, venture capital availability and financial market development variables. According to the results in Appendix III, the financial market development variable is normally distributed ($SW = 0.995$, $p = 0.881$), whereas venture capital availability ($SW = 0.958$, $p = 0.000$) and ease of access to loans ($SW = 0.981$, $p = 0.040$) were initially not normally distributed.

The ease of access to loans and venture capital availability variables were transformed using the logarithmic (LN10) transformation technique (refer to Appendix IV for descriptive statistics). The transformed variables were subsequently tested for normality of distribution and the result indicated that both the ease of access to loans ($SW = 0.985$, $p = 0.121$) and venture capital availability ($SW = 0.990$, $p = 0.388$) were normally distributed (refer to Appendix V). Furthermore, Appendix VI graphically illustrates that variances of above mentioned variables are homogeneous.

The next step in the research process was to test if there was a statistically significant correlation between the strength of auditing and reporting standards and the above mentioned variables (refer to Table 5). The results illustrate that statistically significant correlation exists between the strength of auditing and reporting standards and ease of access to loan ($C = 0.632$, $p = 0.000$), venture capital availability ($C = 0.680$, $p = 0.000$) and financial market development ($C = 0.886$, $p = 0.000$).

Although there exists statistically significant correlation between the strength of auditing and reporting standards and ease of access to loans, venture capital availability and financial market development, regression analysis shows different results. More specifically, according to regression results where the strength of auditing and reporting standards was an independent variable, adjusted R square was 0.396 in relation to ease of access to loans, 0.459 for venture capital availability and 0.784 for financial market development. Please refer to Appendix VII for regression test results and tests of their statistical significance. The fact that regression coefficient for

financial market development is twice as much as it is for access to loans confirms the theory that equity capital is particularly sensitive to financial reporting (Manyara & Benuto, 2014).

Table 5 Pearson's Correlation Results

| Correlations | | | | | |
|--|---------------------|--|---------|---------|------------------------------|
| | | Strength of auditing and reporting standards, 1-7 (best) | EAL_2 | VCA_2 | Financial market development |
| Strength of auditing and reporting standards, 1-7 (best) | Pearson Correlation | 1 | 0.632** | 0.680** | 0.886** |
| | Sig. (2-tailed) | | 0.000 | 0.000 | 0.000 |
| | N | 144 | 144 | 144 | 144 |
| EAL_2 | Pearson Correlation | 0.632** | 1 | 0.916** | 0.761** |
| | Sig. (2-tailed) | 0.000 | | 0.000 | 0.000 |
| | N | 144 | 144 | 144 | 144 |
| VCA_2 | Pearson Correlation | 0.680** | 0.916** | 1 | 0.803** |
| | Sig. (2-tailed) | 0.000 | 0.000 | | 0.000 |
| | N | 144 | 144 | 144 | 144 |
| Financial market development | Pearson Correlation | 0.886** | 0.761** | 0.803** | 1 |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | |
| | N | 144 | 144 | 144 | 144 |

Note: **. Correlation is significant at the 0.01 level (2-tailed).

Considering the fact that the strength of auditing and reporting standards proved to be an important determinant of the ease of access to equity capital and financial market development, the next step of research tests the importance of the strength of auditing and reporting standards in conjunction with regulation of securities exchanges to the level of financial market development. Appendix VIII shows descriptive statistics and normality test results (SW = 0.988, p = 0.249) for the regulation of securities variable. Appendix XIX illustrates that variances of the above mentioned variables are homogeneous.

Table 6 shows that multiple regression test result, where adjusted R square is 0.833. In other words, as much 83% of the level of financial market development is determined by the strength of auditing and reporting standards and regulation of securities exchanges. Appendix X illustrates that adjusted R square figure in the amount of 0.833 is a statistically significant number.

Table 6 Regression Analysis

| Model Summary | | | | |
|---------------|--------------------|----------|-------------------|----------------------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | 0.914 ^a | 0.835 | 0.833 | 0.323097199 |

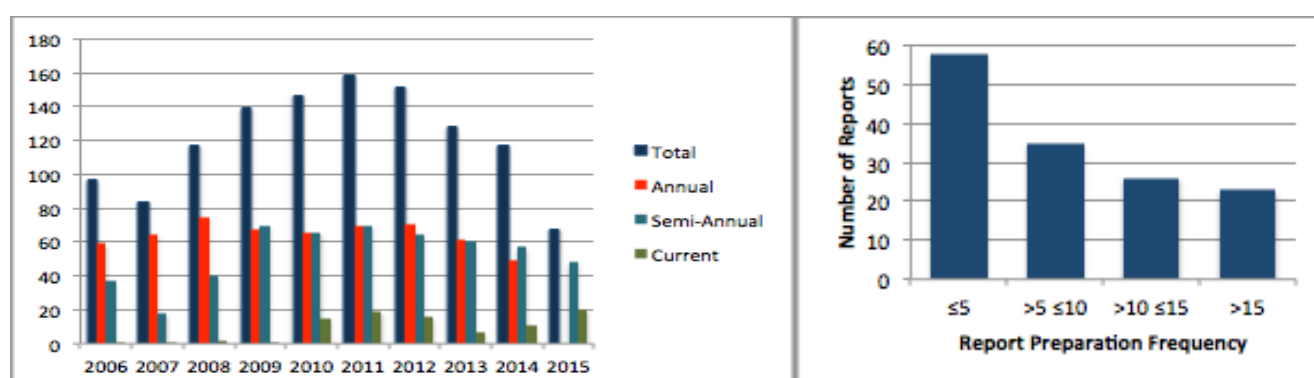
Note: a. Predictors: (Constant), Regulation of securities exchanges, 1-7 (best), Strength of auditing and reporting standards, 1-7 (best)

In the first stage of this research, we have used cross country analyses to study the role of the development of auditing and reporting standards and their enforcement in relation to the level of countries' financial development and concluded that financial reporting is an important factor in the development of countries' financial industry. We have also formed an expectation that Georgia ranks below average both in terms of the development of financial reporting and the development of financial industry.

Once we have concluded that financial reporting and the enforcement of accounting standards influence the level of equity financing opportunities throughout the world, we then analyzed financial reporting patterns of Joint Stock Companies (JSC) in the Republic of Georgia. Considering the fact that the World Bank refers to the GSE as

shallow and underdeveloped and points out serious deficiencies in enforcement of international accounting and auditing standards, our expectation is that we will not be able to find statistically significant correlation between the level of financial transparency and equity capital.

The Georgian Stock Exchange web site was used as a source of information. More specifically, we retrieved financial reports from the above mentioned website. As of September of 2015, there were 143 companies' reports on GSE website. Out of total number of 1,208 reports, 584 were annual financial report, 531 were half year financial report and 93 — current report regarding material events. These reports have been submitted over roughly a 10-year period (2006-2015). As it is evident from Figure 2, there is a declining trend of financial reporting frequency for Georgian JSCs.



Figures 2-3 Reporting Frequencies per Year, Reporting Frequencies by JSCs by Total Reports Submitted

Another alarming trend from Figure 2 is that annual financial reports submitted in 2014 is 31% lower than the same indicator in 2012. Figure 3 shows total frequencies of report preparation by companies during the 2006-2015 period. It is evident that companies that prepared financial reports less than 5 times represents the largest group of the sample, 41%. Then come companies that prepared financial reports between 5 and 10 times — 25% and between 10 and 15 times — 18%. Companies that prepared reports more than 15 times during the last ten years represent only 16% of the total number of companies. In contrast, one Polish company from a Warsaw Stock Exchange prepared more than 275 reports during the last two year period (Warsaw Stock Exchange, 2015).

The above-mentioned trend is even more pervasive when we consider just annual and semi-annual financial reports (i.e., excluding current reports) submitted by JSCs: in that case the 42% of the companies prepared financial reports less than 5 times and only 10% prepared more than 15 times. Financial reporting frequency ordinarily simplifies companies' access to equity. According to researchers such as Fu, Kraft and Zheng, "financial reporting frequency reduces informational asymmetry and cost of equity," hence increasing access to capital (Fu, Kraft, & Zhang, 2012). Considering that there is little to no enforcement of accounting standards in Georgia, preparation of financial reports for the GSE is basically a voluntary process. Therefore, our expectation was that we would not be able to draw statistically significant conclusions based on analysis of financial reports available on GSE's website.

To illustrate that it would be impractical to draw statistically significant conclusions based on JSC's financial reports on the GSE website, we can examine capital structure ratio of JSCs, more specifically Owners' Equity divided by Total Liabilities (OE/L Ratio). From the population of 142 companies, we have analyzed last submitted financial reports of 125 companies because the financial reports of the excluded 17 companies, in our judgment,

did not contain the essential requirements of an IFRS financial report. Considering the lack of proper IFRS enforcement in Georgia, the above mentioned financial reports contained errors such as the sum of total liabilities and owners' equity did not reconcile with total assets. However, full conformity of the rest of 125 "audited" financial statements is also very debatable. Our sample size provides us with more than 95% of confidence interval, given the fact that required minimum sample size is 104 for a population of 142 in order to achieve a 95% confidence interval.

Table 7 shows basic descriptive statistics for the reporting frequency and OE/L variables. The minimum value for the frequency variable is 1, maximum — 30 and a standard deviation — 5.752. In terms of OE/L ratio, the minimum value is 0.0166, maximum — 32.70 and standard deviation — 144.14. The initial normality examinations based on Schapiro-Wilk and Kolmogorov-Smirnov tests indicated that these variables were not normally distributed (please refer to Appendix XI). The financial reporting frequency was transformed using the square root transformation technique, whereas the OE/L ratio was transformed using logarithmic transformation (LN10). We then tested the transformed variables for normality and found that both financial reporting frequency (KS = 0.075, $p = 0.080$) and OE/L ratio (SW = 0.988, $p = 0.388$) are normally distributed (please refer to Appendix XII).

Table 7 Descriptive Statistics

| Descriptive Statistics | | | | | |
|------------------------|-----|---------|-----------|-----------|----------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| Frequency | 125 | 1 | 30 | 8.42 | 5.752 |
| Ratio | 125 | 0.0166 | 1219.5625 | 32.698607 | 144.1454258 |
| Valid N (listwise) | 125 | | | | |

The Levene's test was used to ascertain the homogeneity of variances (please refer to Appendix XIII) and we confirmed the null hypothesis ($L = 1.423$, $p = 0.141$). When we tested the financial reporting frequency and OE/L ratio for correlation and conducted regression analysis where the reporting frequency was an independent variable, our results did not indicate neither a statistically significant correlation coefficient ($p = 0.141$) nor a regression result ($p = 0.208$) (refer to Appendices XIV-XV).

3. Conclusion

Our research provided us with the result that the strength of financial reporting and auditing standards and financial market regulation heavily influence not only financial market development (by as much as 78%, refer to Appendix VII), but also financing capabilities through local equity markets (by 57%). This confirms the main hypothesis of our research in the sense that effective financial reporting and its enforcement simplifies companies' access to capital (Kim, Shi, & Zhou, 2014).

It is worth to mention that our results indicated that equity capital is particularly sensitive to financial reporting, which is in line with Myers' and Majluf's findings (Manyara & Benuto, 2014). More specifically, our regression analyses indicated that when the strength of reporting and auditing standards was an independent variable, regression value (adjusted R square of 0.784) for financial market development was significantly higher than regression values for ease of access to loans (adjusted R square of 0.396) and venture capital availability (adjusted R square of 0.459). In other words, financial reporting was almost twice as important to equity market development (78% influence) as it was for obtaining financing through loans (40% influence). Furthermore, our

multiple regression analysis indicated that the combination of the strength of reporting and auditing standards and financial market regulation were the most important predictors, with as much as 83% share of influence, of financial market development throughout the world.

We then descriptively analyzed financial reporting patterns of JSCs listed on the GSE. Based on the reports by international organizations such as the World Bank and the OECD, we have formed an expectation that it would be impractical to draw statistically significant conclusions from data publicly available on GSE's website due to deficient quality of publicly available information in Georgia. We illustrated the deficiency of quality of financial information available on the GSE website by analyzing capital to debt ratio and confirmed our initial expectation. To further this research, it would be meaningful either to access financial information regarding Georgian JSCs from sources other than the GSE in order to draw significant conclusions and study the impact of institutional characteristics that hinder the development of effective financial reporting systems in the country.

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Impact of Financial Reporting on Access to Capital

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Appendix I Statistical Significance of Regression Analysis

| Coefficients ^a | | | | | | | | |
|---------------------------|--|-----------------------------|------------|---------------------------|--------|-------|---------------------------------|-------------|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | -0.234 | 0.267 | | -0.874 | 0.383 | -0.762 | 0.295 |
| | Strength of auditing and reporting standards, 1-7 (best) | 0.786 | 0.057 | 0.759 | 13.881 | 0.000 | 0.674 | 0.898 |

Note: a. Dependent Variable: Financing through local equity market, 1-7 (best)

Appendix II Descriptive Statistics

| Descriptive Statistics | | | | | |
|--|-----|----------|----------|------------|----------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| Ease of access to loans, 1-7 (best) | 144 | 1.366893 | 5.076217 | 2.85586634 | 0.757671055 |
| Venture capital availability, 1-7 (best) | 144 | 1.474669 | 4.775331 | 2.76244765 | 0.715950753 |
| Financial market development | 144 | 1.949807 | 5.914702 | 4.01857189 | 0.790419010 |
| Valid N (listwise) | 144 | | | | |

Appendix III Normality Test

| Tests of Normality | | | | | | |
|--|---------------------------------|-----|--------|--------------|-----|-------|
| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Ease of access to loans, 1-7 (best) | 0.083 | 144 | 0.016 | 0.981 | 144 | 0.040 |
| Venture capital availability, 1-7 (best) | 0.106 | 144 | 0.000 | 0.958 | 144 | 0.000 |
| Financial market development | 0.056 | 144 | 0.200* | 0.995 | 144 | 0.881 |

Note: *. This is a lower bound of the true significance; a. Lilliefors Significance Correction.

Appendix IV Descriptive Statistics

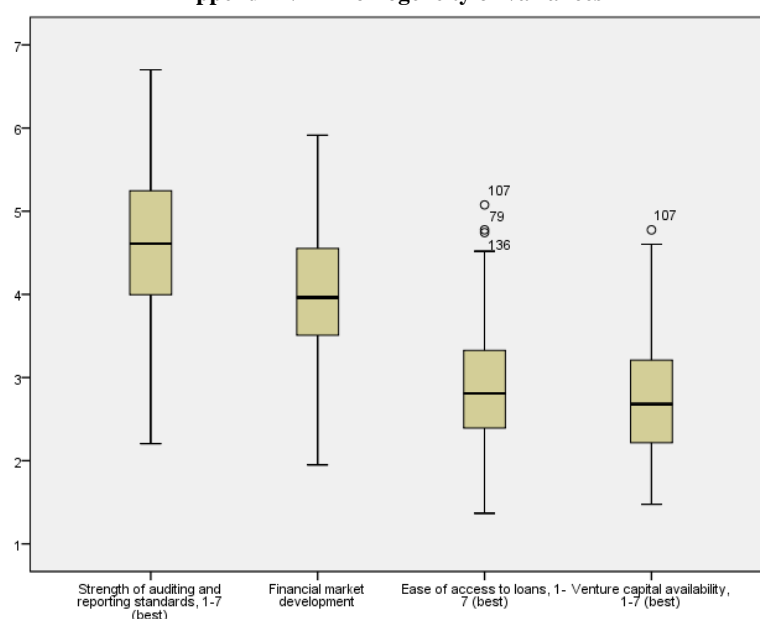
| Descriptive Statistics | | | | | |
|------------------------|-----|---------|---------|--------|----------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| EAL_2 | 144 | 0.14 | 0.71 | 0.4402 | 0.11803 |
| VCA_2 | 144 | 0.17 | 0.68 | 0.4273 | 0.11030 |
| Valid N (listwise) | 144 | | | | |

Appendix V Normality Test

| Tests of Normality | | | | | | |
|--------------------|---------------------------------|-----|--------|--------------|-----|-------|
| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
| | Statistic | df | Sig. | Statistic | df | Sig. |
| EAL_2 | 0.058 | 144 | 0.200* | 0.985 | 144 | 0.121 |
| VCA_2 | 0.055 | 144 | 0.200* | 0.990 | 144 | 0.388 |

Note: *. This is a lower bound of the true significance; a. Lilliefors Significance Correction.

Appendix VI Homogeneity of Variances



Appendix VII Regression Analyses

| Model Summary ^b | | | | |
|----------------------------|--------------------|----------|-------------------|----------------------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | 0.632 ^a | 0.400 | 0.396 | 0.09175 |

Note: a. Predictors: (Constant), Strength of auditing and reporting standards, 1-7 (best);

b. Dependent Variable: EAL_2.

| Coefficients ^a | | | | | | | | |
|---------------------------|--|-----------------------------|------------|---------------------------|-------|-------|---------------------------------|-------------|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 0.064 | 0.039 | | 1.638 | 0.104 | -0.013 | 0.142 |
| | Strength of auditing and reporting standards, 1-7 (best) | 0.081 | 0.008 | 0.632 | 9.729 | 0.000 | 0.065 | 0.098 |

Note: a. Dependent Variable: EAL_2.

| Model Summary ^b | | | | |
|----------------------------|--------------------|----------|-------------------|----------------------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | 0.680 ^a | 0.463 | 0.459 | 0.08115 |

Note: a. Predictors: (Constant), Strength of auditing and reporting standards, 1-7 (best);

b. Dependent Variable: VCA_2

| Coefficients ^a | | | | | | | | |
|---------------------------|--|-----------------------------|------------|---------------------------|--------|-------|---------------------------------|-------------|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 0.050 | 0.035 | | 1.428 | 0.155 | -0.019 | 0.119 |
| | Strength of auditing and reporting standards, 1-7 (best) | 0.082 | 0.007 | 0.680 | 11.054 | 0.000 | 0.067 | 0.096 |

Note: a. Dependent Variable: VCA_2.

Impact of Financial Reporting on Access to Capital

| Model Summary ^b | | | | |
|----------------------------|--------------------|----------|-------------------|----------------------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | 0.886 ^a | 0.786 | 0.784 | 0.367063415 |

Note: a. Predictors: (Constant), Strength of auditing and reporting standards, 1-7 (best);

b. Dependent Variable: Financial market development

| Coefficients ^a | | | | | | | | |
|---------------------------|--|-----------------------------|------------|---------------------------|--------|-------|---------------------------------|-------------|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 0.492 | 0.158 | | 3.122 | 0.002 | 0.180 | 0.803 |
| | Strength of auditing and reporting standards, 1-7 (best) | 0.762 | 0.033 | 0.886 | 22.827 | 0.000 | 0.696 | 0.828 |

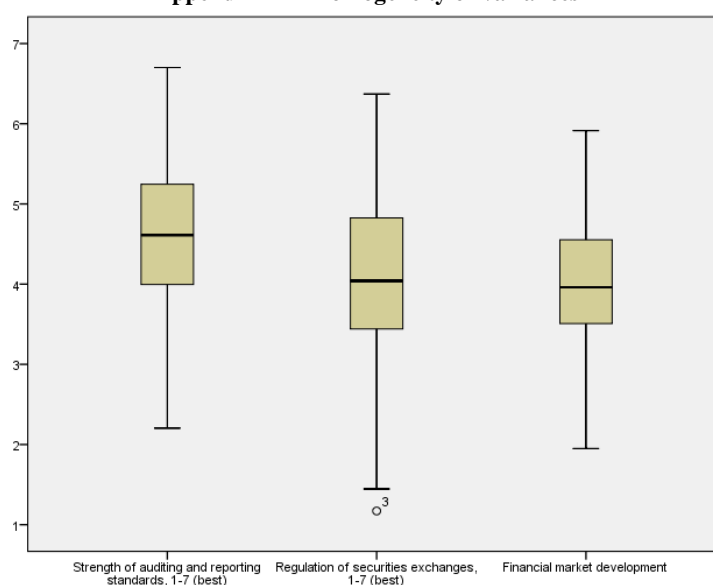
Note: a. Dependent Variable: Financial market development.

Appendix VIII Descriptive Statistics and Normality Test

| Descriptive Statistics | | | | | | |
|--|---------------------------------|----------|--------------------|--------------|----------------|-------|
| | N | Minimum | Maximum | Mean | Std. Deviation | |
| Regulation of securities exchanges, 1-7 (best) | 144 | 1.171561 | 6.369586 | 4.06611228 | 1.074550857 | |
| Valid N (listwise) | 144 | | | | | |
| Tests of Normality | | | | | | |
| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Regulation of securities exchanges, 1-7 (best) | 0.045 | 144 | 0.200 [*] | 0.988 | 144 | 0.249 |

Note: *. This is a lower bound of the true significance; a. Lilliefors Significance Correction

Appendix IX – Homogeneity of Variances



Appendix X Statistical Significance of Regression Analysis

| Coefficients ^a | | | | | | |
|---------------------------|--|-----------------------------|------------|---------------------------|-------|-------|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 0.857 | 0.150 | | 5.730 | 0.000 |
| | Strength of auditing and reporting standards, 1-7 (best) | 0.323 | 0.074 | 0.376 | 4.393 | 0.000 |
| | Regulation of securities exchanges, 1-7 (best) | 0.409 | 0.063 | 0.557 | 6.502 | 0.000 |

Note: a. Dependent Variable: Financial market development.

Appendix XI – Normality Test

| Tests of Normality | | | | | | |
|--------------------|---------------------------------|-----|-------|--------------|-----|-------|
| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Frequency | 0.127 | 125 | 0.000 | 0.930 | 125 | 0.000 |
| Ratio | 0.410 | 125 | 0.000 | 0.204 | 125 | 0.000 |

Note: a. Lilliefors Significance Correction.

Appendix XII Normality Tests of Transformed Variables

| Tests of Normality | | | | | | |
|--------------------|---------------------------------|-----|--------|--------------|-----|-------|
| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Ratio_Trans | 0.061 | 125 | 0.200* | 0.988 | 125 | 0.338 |

Note: *. This is a lower bound of the true significance; a. Lilliefors Significance Correction.

| Tests of Normality | | | | | | |
|--------------------|---------------------------------|-----|-------|--------------|-----|-------|
| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Frequency_Trans | .075 | 125 | 0.080 | 0.974 | 125 | 0.018 |

Note: a. Lilliefors Significance Correction.

Appendix XIII Levene's Test

| Test of Homogeneity of Variances | | | |
|----------------------------------|-----|-----|-------|
| Ratio_Trans | | | |
| Levene Statistic | df1 | df2 | Sig. |
| 1.423 | 17 | 103 | 0.141 |

Appendix XIV Correlation

| Correlations | | | |
|-----------------|---------------------|-------------|-----------------|
| | | Ratio_Trans | Frequency_Trans |
| Ratio_Trans | Pearson Correlation | 1 | 0.114 |
| | Sig. (2-tailed) | | 0.208 |
| | N | 124 | 124 |
| Frequency_Trans | Pearson Correlation | 0.114 | 1 |
| | Sig. (2-tailed) | 0.208 | |
| | N | 124 | 124 |

Appendix XV Regression

| Model Summary | | | | |
|---------------|--------------------|----------|-------------------|----------------------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | 0.114 ^a | 0.013 | 0.005 | 1.00332 |

Note: a. Predictors: (Constant), Frequency_Trans.

| Coefficients ^a | | | | | | |
|---------------------------|-----------------|-----------------------------|------------|---------------------------|-------|-------|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 0.136 | 0.258 | | 0.528 | 0.599 |
| | Frequency_Trans | 0.113 | 0.089 | 0.114 | 1.266 | 0.208 |

Note: a. Dependent Variable: Ratio_Trans.

Corporate Social Responsibility and Accounting Credit — Based on the Case of Hainan Honz Pharmaceutical Co.

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Abstract: Based on Chinese listed companies “Hainan Honz pharmaceutical co.”, this paper analyzes the two conflict behavior: on the one hand, in 2008, it has been awarded “Excellent Enterprise” and “the most Responsible Enterprise in 30 years of Reform and Opening”; on the other hand, in 2014, it has been found guilty of financial fraud by China Securities Regulatory Commission in 2011 and 2012. This paper investigates the cause of the separation of corporate social responsibility and accounting credit. We analyzes the evaluation system of “the most Responsibility Enterprise” with the method of statistics and classification and also the influencing factors of performing corporate social responsibility. We found the core content of corporate social responsibility evaluation system and the relationship with accounting credit.

Key words: corporate social responsibility; accounting credit; evaluation system of “the most Responsibility Enterprise”; Hainan Honz Pharmaceutical Co., Ltd.

JEL code: M4

1. Questions

30 June 2014, Hainan Regulatory Authority of China Securities Regulatory Commission (hereinafter referred to as CSRC) made the decision that determining Hainan Honz Pharmaceutical Co., Ltd. (hereinafter referred to as HONZ) the illegal facts of financial fraud in 2011 and 2012. Hainan Regulatory Authority decided that HONZ shall be warned and imposed a fine of ¥350,000 and some executives were imposed fines of varying amounts. 7 March 2015, China Securities Times news: Because of inflating profits for two years, HONZ was filed a claim which is the first case in GEM Listed Company.

HONZ has been an excellent company which has a variety of honors such as “Excellent Enterprise” and “the most Responsible Enterprise in 30 years of Reform and Opening”. And “the most Responsible Enterprise in 30 years of Reform and Opening” is 2008’s award of the selection activity of “the most Responsible Enterprise” which is advocated by the government. But why did it have the behavior of financial fraud? Why did corporate social responsibility (hereinafter referred to as CSR) and accounting credit separate? This paper aims to analysis the cause of these problems.

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2. The Case of HONZ

Company Name: Hainan Honz Pharmaceutical Co., Ltd.

Stock Code: SZ300086;

Industry: pharmaceutical manufacturing

Listing Date: 2010-05-26

Table 1 HONZ Major Events and CSR Performance

| Year | Major Historical Events | CSR Performance | Honors |
|------|---|---|---|
| 1994 | incorporation | | |
| 2007 | shareholding reform | | China's outstanding brand of high-tech industry |
| 2008 | "the most Responsible Enterprise in 30 years of Reform and Opening" "Excellent Enterprise" | eight hundred thousand RMB donations for the Wenchuan earthquake | "the most Responsible Enterprise in 30 years of Reform and Opening" "Excellent Enterprise" "Hainan's most influential star industrial enterprises" |
| 2009 | | | "China's top venture enterprises" "Haikou's innovative enterprises" |
| 2010 | IPO | 4.5 million donations RMB for the Yushu earthquake and Wenchang rain disaster | "China's top ten most growth enterprises" |
| 2011 | financial fraud | Red Face Fund was established Hainan Honz Pharmaceutical Co., Ltd donates one million RMB in the first phase | |
| 2012 | financial fraud | Red Face Fund | |
| 2013 | investigated by CSRC | 1.4 million RMB donations for Yaan earthquake and Puning flood Red Face Fund | |
| 2014 | punished by CSRC | Red Face Fund | |

Source: Hainan Honz Pharmaceutical Co., Ltd of home page: <http://www.honz.com.cn/about/index.aspx?MenuId=020301>

The following is the basic information of HONZ:

2.1 Developing History

2007, Shareholding reform; 2008, "the most Responsible Enterprise in 30 years of Reform and Opening" and "Excellent Enterprise"; 2009, "China's top venture enterprises" and "Haikou's innovative enterprise"; 2010, IPO; 2011, financial fraud of inflating profits; 2012, financial fraud of inflating profits; 2014 punished by CSRC.

2.2 Charity¹

Red Face Fund² which was established in 2011 has been committed to children's charities in national poverty county. HONZ had donated 16.7 million RMB in several major disasters during 2008-2013 in China.

2.3 Financial Fraud

The amount of HONZ company financial fraud³ is 6.261 million RMB. In 2011, the amount of inflating profits is 3.953 million RMB including recognizing sales revenue 1.568 million RMB in advance and failing the accrued period charge 2.385 million RMB. In 2012, the amount of inflating profits is 2.308 million RMB because

¹ The information comes from Hainan Honz Pharmaceutical Co., Ltd company homepage.

² The Red Face Fund: the Red Face Fund was established on September 23, 2011. The fund was set up by the China children and teenagers' fund and Hainan Honz Pharmaceutical Co., Ltd. As the sponsor, Hainan Honz Pharmaceutical Co., Ltd take the first donation of one million RMB as start-up fund, and it also response for the follow-up funds. The Red Face Fund purpose: committed to children's charities, take care of poor children grow, and offers a variety of forms of aid, promote social harmony and progress.

³ China Securities Regulatory Commission: <http://www.gw.com.cn/news/news/2014/0701/200000358106.shtml>.

of failing the accrued period charge.

We analyze the impact of financial fraud. On the one hand, we collected figures of 2008 to 2012 from HONZ published annual report⁴, which were revenue, operating profit and net profit, and shows them in Table 2 and Figure 1. On the other hand, we figure it out by deducting the financial fraud data in Tables 3 and Figure 2. According to Tables 2 and 3, and Figures 1 and 2, we can see that operating performance of HONZ fell sharply and made loss in 2011, however, HONZ use financial fraud means to turn loss into profits.

Table 2 The Finance Data of HONZ from 2008 to 2012 (In Ten Thousand RMB)

| Year | 2012 | 2011 | 2010 | 2009 | 2008 |
|------------------|--------|--------|--------|--------|--------|
| Revenue | 36,878 | 30,674 | 31,445 | 21,878 | 13,585 |
| Operating Profit | 1,131 | 188 | 16,044 | 11,428 | 5,797 |
| Net Profit | 1963 | 353 | 13932 | 9758 | 4952 |

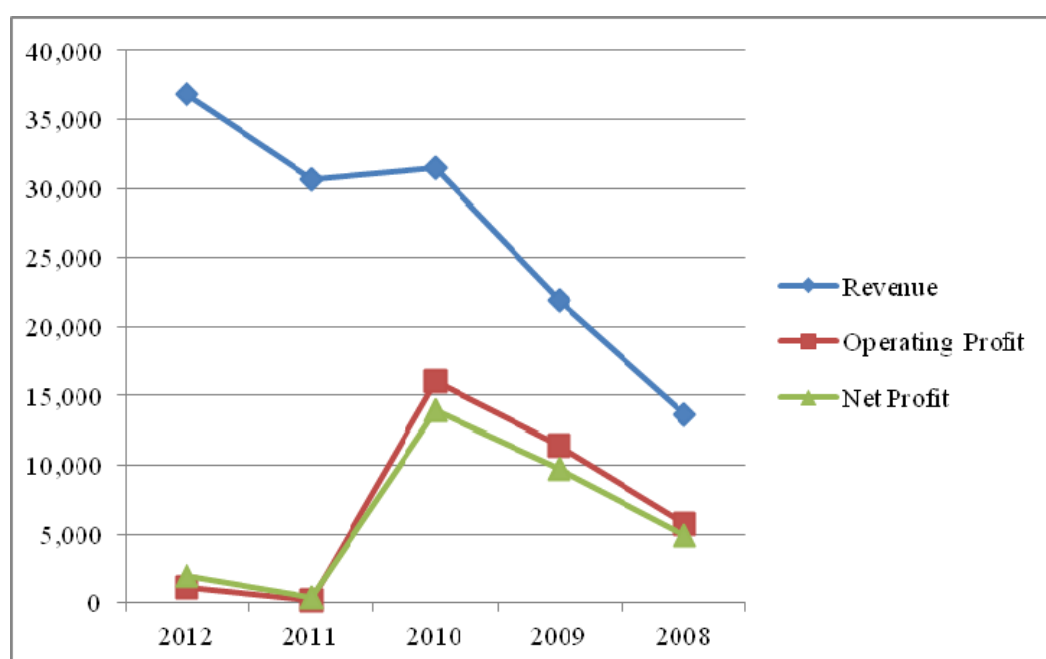


Figure 1 Plotting Line Graph of Finance Data of HONZ from 2008 to 2012

Table 3 The Finance Data after the Deduction of the Financial Fraud of HONZ from 2008 to 2012 (In Ten Thousand RMB)

| Year | 2012 | 2011 | 2010 | 2009 | 2008 |
|------------------|----------|----------|--------|--------|--------|
| Revenue | 37,034.8 | 30,517.2 | 31,445 | 21,878 | 13,585 |
| Operating Profit | 1,057 | -207.3 | 16,044 | 11,428 | 5,797 |
| Net Profit | 1889 | -42.3 | 13932 | 9758 | 4952 |

⁴ The information comes from Hainan Honz Pharmaceutical Co., Ltd company homepage.

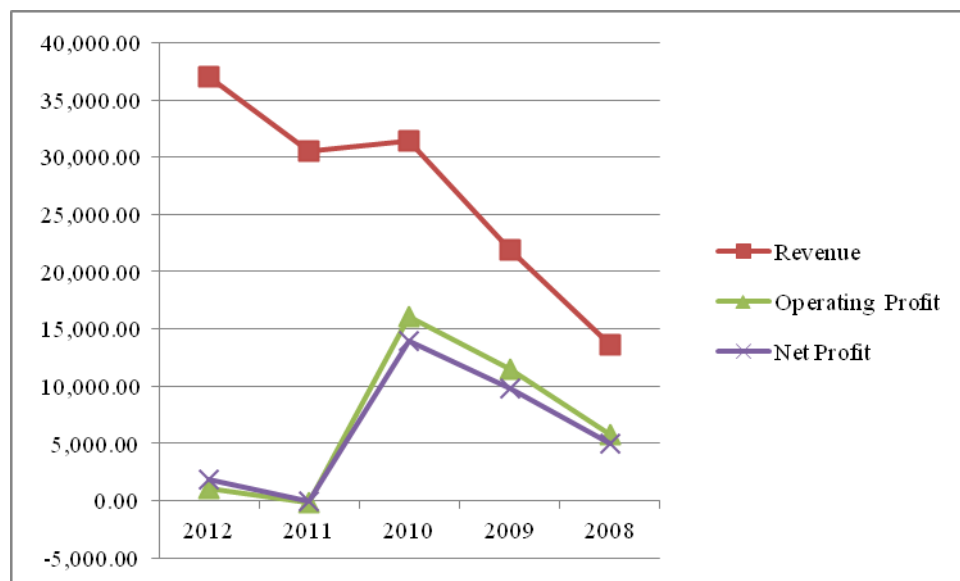


Figure 2 Plotting Line Graph of Finance Data after the Deduction of the Financial Fraud of HONZ from 2008 to 2012

HONZ had won many honorary titles, especially the honor of “the most Responsible Enterprise in 30 years of Reform and Opening”, how could the behavior of financial fraud have happened? We focus on the selection activity of “the most Responsible Enterprise” and hope to find the answer.

3. “The International BBS of China•CSR”

3.1 Origin

“The international BBS of China • CSR (hereinafter referred to as BBS)” was set up in 2005. It aims to advocate the value of “responsibility created harmonization” and promote the spread of the concept of CSR in China. The BBS focuses on the quality, environmental protection and public welfare and it has selected “the most Responsible Enterprises” every year among the whole of China since 2005. So far, there have been more than one hundred enterprises including China Construction Bank, Lenovo and Ping an of China obtained “the most Responsible Enterprise”. HONZ awarded “the most Responsible Enterprise” in 2008.

3.2 Organization

Guidance units: Ministry Of Commerce of the People’s Republic of China, State-owned Assets Supervision and Administration Commission of the State Council, State Administration for Industry & Commerce of the People’s Republic of China, General Administration of Quality Supervision, Inspection and Quarantine of the People’s Republic of China, State Administration of Work Safety, Overseas Chinese Affairs Office of the State Council, the Red Cross Society of China, China News Service.

3.3 Sponsor

China News Weekly⁵, China Red Cross Foundation⁶

⁵ China News Weekly, sponsored by the China news service. China news editing and publication of “China news weekly” is one of the most well-known political magazine in China. China news agency referred to the China news service, a state news agency of the People’s Republic of China. The China news service report the foreign business as its main news, the most of its service object are the people in Hong Kong and Macao compatriots, overseas Chinese, Taiwanese and foreign.

⁶ The Chinese Red Cross foundation is directed by the head of the Red Cross society of China, and it has the independent legal

3.4 Selection Method

Organizing committee issues a set of evaluation index system every year and take synthesis method of information collection, data statistics, enterprise voluntary reporting, a public vote and peer-reviewed.

3.5 Effect

The BBS convenes at the beginning of each year before the two sessions which are the National People's Congress and the Chinese people's political consultative conference (CPPCC). Along with the "China news weekly", the summary of results will be published and served two scene. So it is an important communication platform between government and enterprise. Meanwhile the international mainstream media will be invited to participate in the BBS.

Obviously, the BBS selection has great influence to the society. It is an incentive of government and society to promote CSR. The award of "the most Responsible Enterprise" has great influence to the HONZ. Then we will analyze the evaluation index system of "the most Responsible Enterprise" selection activity.

4. The Evaluation Index System of "The Most Responsible Enterprise" Selection

We have investigated and researched the information of the selection activities from 2005 to 2014⁷, especially the online declaration index system which we called evaluation index system. And from that we get two stages of the evaluation⁸. The first stage is from 2005 to 2008 and we called System I. The second stage is from 2010 to 2013 and we call System II. We analyzed the characteristics of the selection of "the most Social Responsibility Enterprises" based on the comparison of System I and System II, and we get Table 4.

Table 4 The Comparison Table of System I and System II

| Level indicators | Secondary indicators | System I | System II |
|-----------------------------|--|----------|-----------|
| Basic situation | business types and organizational forms | √ | √ |
| Policy and Regulation | the number of directors, independent directors and supervisors | | √ |
| | the committee in charge of CSR | | √ |
| Strategic management system | CSR system certification | √ | |
| | participate in social CSR related associations | √ | |
| | CSR department | √ | |
| | CSR goals | √ | |
| | CSR supervision and evaluation system | √ | |
| | work record about CSR | √ | |
| | CSR report | √ | |
| | into the strategic planning and management system | √ | √ |
| Economic performance | performance indicators (revenue, cost and profit) | √ | √ |
| | pollutants' types and emissions | √ | |
| | sewage charges | √ | |
| | environmental staff | √ | |
| | expenditure of pollution control and environmental subsidies | √ | |

person status of the national public offering foundation. The Chinese Red Cross foundation is led by the state council of the People's Republic of China.

⁷ source: <http://finance.sina.com.cn/hy/20081027/15585434832.shtml> etc.

⁸ The information was all collected apart from 2009 and 2014, you can find the two phase analysis in Table 1.

Corporate Social Responsibility and Accounting Credit-based on the Case of Hainan Honz Pharmaceutical Co.

| | | | |
|---------------------------|--|---|---|
| Environmental performance | honorary titles on environmental protection | √ | |
| | environmental penalties | √ | |
| | measures to avoid or reduce environmental pollution | √ | |
| | participation in social environmental projects | √ | |
| | practices of innovative energy-saving and environmentally friendly development model | √ | |
| | targets and execution of energy conservation and emissions reduction | √ | √ |
| | energy management goals | | √ |
| | target management and review | | √ |
| | energy management is up to standard | | √ |
| | centralized purchasing mechanism | | √ |
| | raw materials recycling mechanism | | √ |
| | management methods of water-saving | | √ |
| | management methods of wastewater's treatment and discharge | | √ |
| | EIA projects | | √ |
| | ISO14001 | | √ |
| | management methods of hazardous waste's transportation and disposal | | √ |
| Charity | participate in direct public welfare activities | √ | |
| | charitable donations behavior | √ | |
| | measures to improve CSR environment | √ | |
| | charity plan | | √ |
| | management processes and policies of social donations | | √ |
| Labor Management | medical services | √ | |
| | facilities of food, accommodation and sanitation | √ | |
| | prohibition of forced labor | √ | |
| | child labor policy | √ | √ |
| | prohibition of discrimination | √ | √ |
| | collective bargaining | √ | √ |
| | reasonable working hours | √ | √ |
| | occupational disease | √ | √ |
| | production safety accident | √ | √ |
| | salary system | √ | √ |
| | dispatch employees equal pay | | √ |
| | staff training | | √ |
| | retired staff management | | √ |
| creditors | deceive and drag loan maliciously | √ | |
| Customer | product quality and safety issues | √ | |
| | marketing fraud | √ | |
| | customer suggestions or complaints management mechanism | | √ |
| Supplier | payment policy | √ | |
| | malicious fraud and deferred loan | √ | |
| | promote upstream and downstream businesses perform CSR | √ | |
| | promote and propagandize CSR | √ | |

| | | | |
|-----------------|--|---|---|
| | responsibility performance of the supplier | | √ |
| | contract terms about human rights | | √ |
| | supplier's regular third party audits | | √ |
| Government | tax law | √ | √ |
| | apply for government subsidies and national fund support | | √ |
| Community | management measures to protect and pacify residents and facilities | | √ |
| | encourage employees to participate in community service | | √ |
| Anti-corruption | anti-corruption policies and management practices | | √ |
| | number of corruption cases and treatment measures | | √ |

Source: Sina Finance: <http://finance.sina.com.cn>.

According to the analysis, we can make the conclusion:

(1) The evaluation index system has been improved from stage one to two. There is no essential difference on content by comparing the two systems, however, it reflects the wider range of CSR and more requirement of institutionalization. In terms of the range, the System II increases the responsibility of community and anti-corruption; In terms of institutionalization, System II requires not only a behavior, but also the strategy and management system. For example, System II requires customer suggestions or complaints management mechanism in Customer management; charity plan, management processes and policies of social donations in Charity.

(2) The substance of the CSR is return to the society in China. It is a system which encourages enterprises clearly to care more about the disadvantaged groups, charities and environmental protection, which takes great pressure of payment to the enterprises. Jian-rong Ma⁹ (2008), director of Lenovo group Ltd, pointed out that "sometimes, the media, the government, the enterprise and the social in China regarded CSR as a payment, one-way payment. However, CSR is not a simply pay-out and sacrifice".

(3) Performance of the CSR is the government's requirement. It is obvious that this is a continuous government-leading selection event. The purpose of this selection is to encourage enterprises more involved in environmental protection and charity. As a result, this event strongly directs the social media and affects enterprises' behavior in CSR, which makes enterprise feel the behavior of CSR, especially charity, is an important chance to shape their social image.

(4) Enterprises care more about the recognition and praise of government rather than accounting credit. The International Accounting Standards requires faithful presentation and so does China's Accounting Standards. It is the basic professional ethics which we called accounting credit, and it should be the foundation of CSR. However, Honz opted for maintaining his social image instead accounting credit in trouble time.

5. Conclusion

Accounting credit is the foundation of CSR, so CSR and accounting credit should be inseparable. Wei-ying Zhang (2007), National School of Development at Peking University, proposed that the real responsibility of entrepreneurs should be creating more value for customers, more job opportunities for people, and more taxes to the country on the basis of honest and trustworthy. But, nowadays the Chinese enterprises are forced to perform CSR because of the pressure of government and society, so they have no time and energy for accounting credit.

⁹ The No. 3 Record of the International BBS of China • CSR, *China News Weekly*.

On the other hand, they do care more about their own social image instead of their image of integrity. And it is easy to take the performance of CSR away from accounting credit.

The government and society should pay more attention to the establishment of CSR foundation which is accounting credit. We need to re-clarify the concept, content and scope of the CSR, the government's role in the process of CSR. Think about how do the corporate really fulfill CSR voluntarily, and where does the power come from?

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Appendix A: List of "The Most Responsible Enterprise" Selection Evaluation Dimension Analysis

See Table A1

Table A1 List of "The Most Responsible Enterprise" Selection Evaluation Dimension Analysis

| Dimension | 2005 | 2006 | 2007 | 2008 | 2010 | 2011 | 2012 | 2013 |
|--|------|------|------|------|------|------|------|------|
| Enterprises status | √ | √ | √ | √ | √ | √ | √ | √ |
| Environmental protection (Environmental performance) | √ | √ | √ | √ | √ | √ | √ | √ |
| Consumer rights (Customer management) | √ | √ | √ | √ | √ | √ | √ | √ |
| Corporate reputation | √ | √ | √ | √ | | | | |
| Social activities (charity) | √ | √ | √ | √ | √ | √ | √ | √ |
| Taxation | √ | √ | √ | √ | √ | √ | √ | √ |
| Others | √ | √ | √ | √ | √ | √ | √ | √ |
| Policy and regulation | | | | | √ | √ | √ | √ |
| Economic performance | | | | | √ | √ | √ | √ |
| Labor management | | | | | √ | √ | √ | √ |
| Supplier management | | | | | √ | √ | √ | √ |
| Community impact | | | | | √ | √ | √ | √ |
| Anti-corruption-related | | | | | √ | √ | √ | √ |

The Integration of Disabled People into the German Labor Market — How the Workplace Health Management Is Able to Complement the Existing Tools

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Abstract: The German labor market, in particular the German small and medium sized enterprises (SME) as a part of the supply side of the labor market, has to deal with huge problems caused by a lack of skilled workers. Not only engineers are missing, but also mechanics, electricians and other craftsman. Among others the most important reason for this is the demographic change the German society is facing. In order to recruit the best qualified employees in the needed amount successfully, German companies will have to use all their possibilities to win the battle for the most talented employees. Especially SME will have to search for new paths to find the appropriate employees. One new approach could be to focus on disabled workers: On the one hand those who are already working within the company, on the other hand those which are new hired from the labor market. This article gives an overview about the impacts of the demographic change in Germany, especially for SME. Furthermore the examination illuminates the three different pillars of the Workplace Health Management (WHM): occupational safety, prevention and the Corporate Integration Management (CIM) and shows a theoretical approach how the Workplace Health Management could be able to support the integration of disabled people. Summarized, away from the advantages for the entire workforce, the WHM includes effective tools for the operational integration of disabled employees and thus can increase the efficiency of the companies.

Key words: disabled employees; workplace health management; SME; demographic change; human resource management

JEL codes: M1, M5

1. Introduction

The German labor market has to deal with huge problems caused by a lack of skilled workers in the near future. Not only engineers are missing, but also mechanics, electricians and other craftsman (Bundesagentur für Arbeit, 2013). Because of the inherent structural characteristics (i.e., short-term personal planning, used search strategies and less attractive working conditions (IAB, 2015)) and the fewer financial resources than the large

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companies the German SME are in particular affected by these problems. Beside the reason that knowledge, which is more difficult to generate for SME than for large companies, is fast becoming the driving force behind labour market competitiveness (Czeglédi-Juhász, 2013) one of the most important reasons for these problems is the demographic change which will change the consistence of the German society. Current reports of the federal statistic service show a decline of the people in the employable age from 15,6 millions in the year 2011 to 12.9 million in 2030 (Federal statistic service 2011). In the same time period the over 65 age-group will increase from 16.7 million to 22.3 million. The predicted “war for talents” will require new ways in the Human Resource Management of the companies. Results of the medium-sized panel of the Federation of German Industries by the end of 2014 (BDI 2014) showed that 90.7% of the participated companies stated that they apply special measures to recruit and train skilled workers. The applied actions were company-based training (64.1%), flexible work time models (52.3%), expansion of the occupational training (51.4%), options making it easier to reconcile work and family life (34.8%) and strengthen recruitment of older workers (33.9%) as response for the demographic challenge (Marosne Kuna, Czegledi et al., 2013).

In addition to the already undertaken measures, a new approach could be to focus on disabled workers: On the one hand those who are already working within the company, on the other hand those which are new hired from the labor market. The current situation for disabled in the German labor market depends very much on the individual age, qualifications and the degree of disability, which makes it difficult to find general conclusions. At the end of 2014 about 178.000 people with disabilities were unemployed in Germany (Bundesagentur für Arbeit, 2014). In comparison: The overall unemployment rate was about 6.4% (Federal statistic service, 2015). Almost 40% of the jobless disabled were 55 years or older. High qualified disabled have typically fewer problems to find an adequate job compared to disabled without these skills and qualifications, however, compared to able bodied people their chances to end unemployment are slightly worse.

Away from the social aspects it is necessary to consider the economic impacts: Facing the demographic change, the German economy can hardly allow a waste of working force. In this sense two elements are important and will become more important in the near future: An intensive examination with the question how to support the health of the personnel body within the companies to avoid sickness and followed by that disabilities on the one hand, and how to improve integration chances for disabled on the other hand.

The Workplace Health Management (WHM) is an upcoming approach within the Human Resource Management. As a theoretical approach this article aims to show which impacts the WHM could provide for other fields (indirect-effects) like the field of the integration of disabled.

2. The Impacts on German SME

The resilience and good performance of the German economy during the last decade to a great extent has its roots in a strong and stable SME segment. Often referred to as the “backbone of the German economy”, the German *Mittelstand* with its longstanding record of high employment and productivity increasingly raises interest abroad, where decision makers are keen to learn from the German model (BMW, 2013). Obviously, there are specific factors unique to the German *Mittelstand* which account for its success and superior performance as well as its stabilizing role in the German economy. German Small and medium sized Enterprises are in fact the backbone of the German Economy. More than 99% of the German companies are SME. Therefore the SME were in the focus of many research projects. But not only the scientific community had a strong interest to generate

insights about the German SME and especially about their macroeconomic role within the German economy.

Policy makers and many more organizations — public and private — had a strong interest to find out more about SME and especially which factors are most important for the market success or failure. This has led to many research results during the last years about German SME and their role for the economy, as well as about SME in Europe, too. SME were in the focus of research very often because of their macro-level importance and their role as *engines for innovation* or for their importance as employers (more than 50% of the German employees work for SME). However, there's only few data (particularly) about the internal processes of German SME concerning their recruitment of personal or the qualification of their workers and how these processes are, organized, monitored and evaluated etc. This lack of data obtained from field work results is quite remarkable, because that would allow to shed some light on some very important aspects which are essential for the performance of SME, e.g., for their Human Resource Management. The skills and qualifications of the SME staff is a crucial and most important element for the German SME that survive and compensate some disadvantages they have compared to big Companies. The SME provide typically special tailored solutions and offer a product-orientated service at the same time. This requires a special know-how and highly qualified staff. Compared with big companies they have some typical disadvantages like difficulties to get access to the financial market or the lack of an organized personal recruitment which is furthermore not supported by a specialized unit within the SME. For example SME in the manufacturing branch have an increased demand for high quality equipment and machinery and high skilled employees. The markets they are in represent a major trade partner for export-oriented German SME in the industrial sector. SME which are engaged in the manufacturing businesses have a strong orientation toward foreign markets, and these companies are highly productive, show high investment ratios, and are responsible for a substantial share of employment. While this exposure in the markets of the emerging countries also bares a certain risk, these SME engaged in the manufacturing industry represent an important stimulus for growth and increase of the competitiveness of the economy as a whole (Tchouvakhina/Schwartz 2013). Data that focuses on disabled and/or SME is quite rare. Data is usually collected by authorities in order to perform legal tasks like calculating social insurance fees. A study of the IAW, the institute for work and economy of the University Bremen in the year 2011 (IAW, 2011) showed, that about seven million disabled lived in Germany, among them there were about three million disabled people between 15 and 65 years of age (potential employees), about three quarters or 2, 2 millions of them were employed. Empirical information about the number of disabled people within SME, like data about disabled in general, is pretty poor. Relevant data is typically collected by German authorities to perform legal tasks like calculating fees for the social insurance. Nevertheless, knowing that as a rough rule of thumb 60% of the employees are working for SME, the conclusion is possible that about 1, 3 million disabled people are employed in German SME.

3. Integration Approaches

There are several approaches to support the integration of disabled into the German labor market. The tools and measures can basically be divided into two groups: Firstly, measures to integrate disabled people by financial support for the employers or by supporting their working environment which allows the handicapped people to start or continue working within the company. Secondly, measures to support the staff within the company to keep their productivity and performance by several approaches like the “Workplace Health Management” which is ideally embedded in a diversity framework concept. In this sense for the try to avoid early-retirement or loss of

work-force as a consequence of long-term sickness the best option is prevention. Prevention within the companies in this sense can be organized by two of the three parts of the WHM: the Workplace Health Promotion and the Corporate Integration Management (CIM) (see Figure 1).

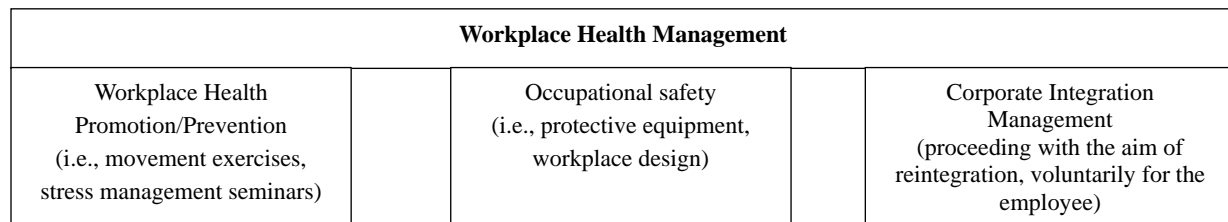


Figure 1 The “Three-Pillar-Model” of the Workplace Health Management

Source: Own illustration based on iqpr 2005

3.1 General Measures to Integrate People with Disabilities

The integration of people with disabilities in Germany is ruled by law. Depending on the type of disability and on the dimension the measures and support is individually organized. Quite a big number of authorities deal with integration of disabled and the number of law prescriptions is very big as well and is not the main focus of this paper. Basically, the kind of disability or sickness is not decisive if the handicapped people can proof their need of support by a medical expertise: the law meets the needs and interests of handicapped people and provides counselling, technical (like special equipment for the workplaces) and financial support if necessary.

Therefore there are many measures and possibilities in Germany to support the integration of people with disabilities into the labor market whether to keep the work for those who became sick or disabled during their employment or to integrate jobless handicapped. In case of financial support for the employers the basic idea is to compensate the reduced output of disabled employees especially at the beginning of their employment.

3.2 Workplace Health Management (WHM)

Beside the described below principal tasks of the WHM, this article aims to show possible indirect-effects for the integration of disabled people into a company.

The cradle of the Workplace Health Management lies in the 1986 Ottawa-Charter (Ottawa Charter for Health Promotion, 1986). Away from that the WHM arose out of the occupational safe, too. In Germany, the third important root is the social security code book IX (SGB IX). This contains the occupational integration of disabled and sick employees. For purpose of this article we use the WHM illustration called the “three-pillar-model” (iqpr 2005). This “three-pillar-model” is divided into the three segments workplace health promotion/prevention, occupational safety and the corporate integration management (see Figure 1).

(1) The function of the occupational safety is to create and preserve healthy and sound working conditions. This work safety is supplemented by the accident prevention. The design of the occupational safety is done by the layout of work processes, work environment and equipment, the work organisation and the employment relationship itself. There are many tools for the integration of disabled people which are similar to the tools of the occupational health and safety protection and therefore similar to the WHM (about the same historical roots), i.e., large displays, special phones. About the proper functioning of the occupational health and safety protection tools, we think that in this area the WHM is not able to improve the integration.

(2) The workplace health promotion is aimed at prevention. The intention is to have influence on the behaviour of employees and the conditions at work. The target of the WHM is to improve the occupational health

(Kaiser, 2011). In the area of behavioural measures among other movement exercises like sport groups, information events (e.g., nutrition), eye examinations, preventive medical check-up, vaccinations (e.g., flu vaccination) and stress management seminars or seminars for personal further development come into consideration (Baumanns & Münch 2010). The field of situational prevention pays attention to ergonomics at the workplace, management of working time, the organization of workflow, nutrition-related measures and health promoting constructional measures. The tools for the integration of disabled people are pretty similar to the tools of the occupational health and safety protection and therefore similar to the WHM. In the section of prevention, disabled people can be better integrated into the company or work community by the implementation of joint actions and projects. These may have two important effects: First the not-handicapped employees become familiar with the handicapped people and as a result possible shyness anxieties can be reduced. Handicapped are perceived as colleagues and not as disabled. Second the handicapped may have more pleasure at the workplace (caused by more personal contact and the actions itself) and thus will have an increased willingness for integration into the company.

(3) The third mainstay, the Corporate Integration Management (CIM), is the last of the three pillars. The CIM was established by law in the year 2004 (§ 83 and § 84 SGB IX/social security code book IX). Aim of the CIM is on the one hand to support the employee to get over his actual disability and on the other hand to prevent a fresh disability and ultimately to receive the workplace of the concerned employee (Adlhoch et al., 2010). The CIM is a proceeding which has to be provided to an employee if he/she is ill more than six weeks in a year. In this case the employer has to provide an integration dialogue to start off the procedure for the employee. This applies not only for handicapped, but also for every employee in every company in Germany. The exact procedure of the CIM-proceeding is not fixed by law. About this it is possible for a company to adapt the proceeding to their own corporate situation and structure. The course of the proceeding will be agreed between the parties. This can be changes at the workplace, changes in the work-team or any other necessary measure. Important points are firstly that the CIM-proceeding is voluntarily for the employee (he/she can terminate it at any time) and secondly that the participants, which are intended to support the employee can be freely chosen by him/her (e.g., the disability manager, the superior, the commissioner for data protection, the corporate social counseling, the equal opportunities officer, the quality management manager, representatives of the health insurance funds and the social security benefits offices). In the field of CIM in the last ten years considerable experience has been gained. This is caused by the fact that the proceeding is prescribed by law and about that many companies were compelled to do integration-processes with not-handicapped employees. These facts launched an altogether different development within the companies. The integration process has been professionalized and now it is common practice in the companies. It is no longer a topic on the periphery which was not important enough to deserve the attention of the management. About these changes in the overall framework, the opportunities for disabled have changed, as well.

4. Conclusions

The social and economic framework in Germany will change massively in the next years. As the German economy depends on high-skilled staff and experts, new paths are needed for the companies to act successfully at the labor market and to hire needed employees. In this sense the focus on the integration of disabled people and the implementation of measures to keep the body of personnel healthy and efficient at the same time are

promising approaches. Beside the principal tasks of the WHM, it seems that the WHM causes indirect-effects for the integration of disabled people into a company. In this relation the CIM-dialogue seems to be the most appropriate tool to complement the existing tools in the integration of disabled people at companies' level. It is supported by the actions in the field of the workplace health promotion, which are also very well suited to play an important role for the individually integration of the disabled into the work community. Additionally to the direct effects on the employees, one other indirect-effect may be that the support of disabled people has a positive influence of what and how people perceive about a company which could be a positive marketing instrument.

To examine the theoretical approach presented in this article, we suggest carrying out empirical investigations. The aim of these examinations should be to investigate which actions of the workplace health promotion (i.e., sport groups) are particularly suited to integrate disabled. Furthermore it should be explored if the performance of CIM factual changed the position of the company managers towards the integration and reintegration. For this purpose the companies which do not perform the CIM (despite the statutory obligation) could serve as reference groups.

Summarized, the WHM is not only a benefit for the entire workforce, but it may also be suitable to complement the existing tools for the operational integration of disabled employees.

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Perception Management: A Strategy for Effective Decision Making and Productive Managerial Performance in Business Organizations: A Survey of Selected Manufacturing Firms in Nigeria

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Abstract: This paper is a critical analysis of perception management as a strategy for effective decision making and productive managerial performance in Business Organizations. The specific focus was on selected manufacturing firms in Nigeria. The study adopted a simple empirical survey method with a view of eliciting relevant data for analytical purpose so as to answer several questions and attain the objectives of the study. Both primary and secondary sources of data collection were used in a bid to attain the necessary results. Five point Likert rating scale questionnaire were used in obtaining the views and opinions of respondents (i.e., strongly agree: 5, agree: 4, undecided: 3, disagree: 2, and strongly disagree: 1). Three (3) hypotheses were formulated and tested. A parametric tool, Analysis of variance test — ANOVA is used to test the three (3) formulated hypothesis. The study found that there are troublesome errors, distortions and biases in perceptions of employees responsible for poor quality decision making and judgments in manufacturing organizations in Nigeria affecting quality performance attainment leading to low profits. The second finding was that there exist numerous factors affecting perception of reality in manufacturing organizations in Nigeria. And the third finding reveals that there are several strategies for managing perception in organizations. In the light of the findings of the study, it is hereby recommended that managers of manufacturing firms in Nigeria needs a constant training, mentoring and orientations on how to be transparent in their transactions and dealings with clients, subordinates colleagues. Supervisors and necessary stakeholders to the organizations as they make decisions pertaining to them and organization in order to attain high performance status. Again, it was recommended that strategies for effective perception management ranging from careful diversity management, impression management of employees, cultural backgrounds, race, and nationality, religious affiliations, ethnic and tribal differences is pertinent for high performance attainment. The study also recommends that managers of the organizations needs to rethink their attitudes, motives, interest, past experiences and expectations to ensure that there is no disharmony with organizational goals and objectives in their respective perceptual inclinations to facilitate decision making process of organizations.

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JEL codes: M1, M3

1. Introduction

The uniqueness of each individuals set of opinions, values, and styles of behavior arises partly from differences in what individuals perceive of the world around them

An individual perceptions influence the formation of attitudes. Values, in turn help to shape perceptions, and they have a direct influence on attitudes.

Perception is the process of noticing and making sense of information. The information reaches us through any of the five (5) senses namely, Sight, hearing, smell, touch and taste. According to Wright and Noe (1996), we count on our senses to give us accurate information. In other words, we trust what we see, hear, touch, taste and smell accurately reflects the world as it objectively is.

As noted by Robbins (1998), perception could be defined as a process by which individuals organize and interpret their sensory impressions in order to give meaning to their environment. However, what one perceives can be substantially different from objective reality. It needs not be, but there is often disagreement.

For example, it is possible that all employees in a firm may view it as a great place to work-favorable working conditions, interesting job assignments, good pay, an understanding and responsible management- but as most of us know, it is very unusual to find such agreement in the organizations.

As observed by Mcshane and Glinow (2000), the perceptual process often leads to inaccurate assumptions and inappropriate behaviors towards people who are different from us. For example by making unfavorable decision, through our attitudinal predispositions towards them by way of beliefs, feelings and intention on them.

The chief executives of organizations or young recruiters may form and rely on inaccurate stereotypes for example and assume that older workers aren't as productive as younger applicants. That older workers are rigid, inflexible, rigid and may cause stagnation and low performance to occur in organizations. However, it is interesting for the management teams of organizations to note that with increasingly diverse workforce, we need to pay closer attention to the perceptual process to minimize these misconceptions, errors and distortions that may arise to subvert attainment of organizational goals and objectives.

It is rewarding to stress at this point that proper perception can result to proper attribution of cause of behavior, decision making and formation of attitudes in a work place this resulting to high organizational performance.

This paper may attempt to address the statement of the research problem, Objectives of Research, Research questions, research hypothesis, review of related literature (i.e., perceptual Errors, factors influencing perception, Remedies and Management of perception in organizations). Theoretical framework on attribution, Methodology, hypothesis testing/discussion of findings, summary conclusion and Recommendations

2. Statement of the Problem

To understand how and why individuals in organizations perceive the same information and attribute meanings to it differently has been a worrisome and problematic trend in Business Organizations. This overtime has affected the quality of decision making process and judgments in organizations resulting to low performance

level. This may be principally as a result of perceptual errors, biases and distortions consistently experienced by Business Organizations in the process of decision making process and judgment of issues which in most cases potentially causes employment discriminations as well as the stress and career limitations that go with this problem. This perceptual biases/errors by manager also threatens the organizational survival.

This have necessitated the curiosity of the researcher to establish how these errors, biases and distortions have effect on our perceptions resulting to poor quality decision making and judgments causing low performance trends in Business Organizations and see how it can be remedied.

3 Objectives of the Study

(1) To identify the troublesome errors, biases and distortions in perceptions responsible for poor quality decision making and judgments of Manufacturing organizations in Nigeria.

(2) To determine the factors influencing perception of reality (e.g., attitudes, motives, interest, expectations) and its effects on the performance of manufacturing organizations in Nigeria.

(3) To determine the strategies for effective Management of perception in Nigerian Manufacturing organizations by Managers.

3.1 Research Questions

(1) To what extent have troublesome errors, biases and distortions in perceptions responsible for poor quality decision making process and judgments in manufacturing organization in Nigeria?

(2) To what extent have the factors influencing perception of reality such as attitude, motives, interest, expectations, amongst other affects performance in manufacturing organizations in Nigeria?

(3) To what extent have the strategies for effective management of perception in manufacturing organizations in Nigeria enhanced performance?

3.2 Research Hypothesis

H₀₁: There are no significant troublesome errors, biases and distortions in perception responsible for poor quality decision making process and judgment in manufacturing organizations in Nigeria?

H₀₂: There are no significant factors influencing perception of reality such as attitude, motives, interest, expectations amongst others affecting performance in manufacturing organizations in Nigeria?

H₀₃: There are no significant strategies for effective management of perception in manufacturing organizations in Nigeria that have enhanced performance.

4. Review of Related Literature

As noted by Schermerhorn, Hunt and Osborn (2005), perception is the process by which people select, organize, interpret, retrieve and respond to information from the world around them. They maintained that, the information is gathered from the five (5) senses of sight, hearing, touch, taste and smell. The perception or response of any two (2) people are also not necessarily identical, even when they are describing the same event.

Through perception people process information inputs into response involving feelings and actions. Perception is a way of forming impressions about oneself, other people and daily life experiences. It also serves as a screen or filter through which information passes before it has an effect on people. The quality or accuracy of a person perception, therefore, has a major impact on his or her responses to a given situation.

Perceptual responses are also likely to vary between managers and subordinate in instances of interview

performance appraisals, future performance goals, career development amongst others (Griffin, 1997).

To Buchanan and Huczynski (2004), Perception is the dynamic psychological process responsible for attending to organizing and interpreting sensory data.

He further emphasized in his research that, the main sources of errors in person's perception include the followings:

- (1) Not collecting enough information about other people
- (2) Basing out judgments on information that is irrelevant or insignificant.
- (3) Seeing what we expect to see and what we want to see, and not investigating further.
- (4) Allowing early information about someone to affect our judgment despite later and contradictory information

- (5) Allowing our own characteristics to affect what we see in others and how we judge them
- (6) Accepting stereotypes uncritically.
- (7) Attempting to decode non-verbal behavior out with the context in which it appears.
- (8) Basing attribution on flimsy and potential irrelevant evidence.

Mitchell (1987) explained perception as the process by which an individual gives meaning to the environment. It involves organizing and interpreting various stimuli into a psychological experience perception is empirical in that it is based on the individuals past experience. Different people will therefore perceive the same thing in different ways. As Ivancevich et al. comment, "*while we think we are describing some objective reality, we are in fact describing our subjective reactions to that reality*". And it is this perception of reality that shapes behavior. To a large extent people interpret the events and the actions of others from their own view point. They see what they want to see.

As noted by Robbins (1998) there exist several factors influencing perception of reality. When an individual looks at a target and attempt to interpret what he or she sees, that interpretation is influenced by personal characteristics of the individual perceiver, the target and the situation. In other words, the existence of several sub-processes of perception gives evidence of the complexity of the nature of the concept.

(a) The Perceiver

Among the more relevant personal characteristics of the perceiver are his attitudes, motives, interest, past experiences, and expectations.

Our attitude towards an issue, object determines the interpretation we give to it. People differs in their attitudes towards issues and objects Hot food makes me seek" "I love it, even hot".

All of these varying preferences will affects our attitudes toward timing of our canteen lunch break.

Unsatisfied needs or motives stimulate individuals and may exert a strong influence on their perceptions as well. Individual interest is capable of channeling our perception. Our attention is influenced by our interest. A supervisor who was recently reprimanded by her boss for high level of lateness among his staff is more likely to be stricter with later coming.

Again, expectations can distort your perceptions in that you will see what you expect to see. If you expect police officers to be authoritative, young people to be unambitious, personnel directors to "like people" or individual holding public office to be unscrupulous, you may perceive them as such regardless of their actual traits.

More to the above, as a manager, your experience with lip service subordinates in your previous jobs may make you indifferent to a new subordinate who display some excessive loyalty even though he is sincere.

(b) The Target

A target is the object of stimulation or the stimuli. Characteristics of the target can affect our perception, e.g., we tend to notice loud people or attractive individuals in a group than quiet or unattractive ones. Motion, sound, size and other attributes of a target will influence the way we see it.

Also, the relationships of a target to background influenced perception. On this premise, we tend to group close or related and similar things together for example Ijesha's and Ekiti's are close tribes in Western part of Nigeria and are grouped as one and perceived as highly educated people.

(c) The Situation

The context in which we see objects or events is important. The elements in the surrounding environment influence our perceptions. For example, I may not notice a 25 year old female in an evening gown and heavy make up at a Night club on Saturday Night. Yet the same woman so attired for my Monday morning management lectures. Class would certainly catch my attention (and that of the rest of the class). The time at which an object or event is seen can influence attention, as can location, light, heat, or any number of situational factors.

5. Common Perceptual Distortions, Troublesome Errors and Biases in Decision Making of Organizational

As illustrated in Mcshane and Glinow (2000), Jones and George (2006) some common kinds of distortions and troublesome errors that can make the perception process inaccurate and affect the response include the following;

(1) **Stereotype:** An individual set of beliefs about the characteristics or attributes of a group, e.g., Ekitis, Ijebus, Hausas, Female managers, Ibo traders etc.

Stereotypes are not always negative and it may or may not be accurate. Stereotype can lead to poor decision. It can create employment barriers for women (e.g., nursing mothers) and people of a particular creed, colour or age. It can undermine employee loyalty and job satisfaction.

According to Buchanan and Huczynski (2004) Stereotyping also works at an international level as shown below:

| S/No | Culture | Stereotyped Image |
|------|----------------|--|
| 1 | American | Demonstrative, talkative, emotional, romantic, bold, artistic |
| 2 | English | (b) Manana attitude, Mache, Music lovers, touchers |
| 3 | French | (c) Inscrutable, intelligent, xenophobic, golfers, group – oriented, polite, soft spoke. |
| 4 | Italian | (d) Conservative, reserved, polite, proper, formal |
| 5 | Latin American | (e) Arrogant, Loud, friendly, impatient, generous, hardworking, monolingual. |
| 6 | Japanese | (f) Arrogant, rude, chauvinistic, romantics, gourmels, cultural, artistic. |

Mullins (1996) emphasized that common stereotyping may be based on;

- (a) Nationality — e.g., all Germans are orderly and industries
- (b) Occupation — e.g., all accountants are boring
- (c) Age — e.g., all young people are unreliable, no old person wants to consider new ideas.
- (d) Physical — e.g., all people with red hair have fiery temperament.
- (e) Education — e.g., all graduates are clever
- (f) Social — e.g., all unemployed people are lazy.

(g) Politics — e.g., all labour voters are in favour of strong trade unions, all conservatives voters support privatization.

(2) Halo Effect Error: This is a judgment of personality based on single, striking characteristic, such as an aspect of speech, dress, posture, nationality, their hairstyle, sociability, appearance, intelligence, etc. A Single prominent trait will lead to contaminate our evaluation of other traits.

(3) Selective Perception: This is the tendency to single out these aspects of a situation, person, or object that are consistent with one's needs, values, or attitudes. Its strongest impact occurs in the attention stage of perception process.

(4) Primacy Error: This error relates to a saying that first impressions are lasting impressions. It is our tendency to quickly form an opinion of people based on the first impression we receive about them. This rapid perceptual organization fulfills our need to make sense of others and provides convenient anchor to integrate subsequent information, for example organizations take extra care to ensure that customers have a good first impression when they join the firm

(5) Recency Effect Error: This occurs when the most recent information dominates our perception of others. In other words, the most recent information has greater influence on our perception of someone when the first impression has worn off with the passage of time (Steiner & Rain, 1989).

(6) Projection Error: We are projecting when a trait in the perceiver is generalized to other people, i.e., the tendency is to attribute one's own characteristics to other people. Too much projections leads to ineffective management.

(7) Fundamental Attribution Error: This refers to the tendency to underestimate the influence of External factors and over estimate the influence of internal factors when making judgments about the behaviour of others. In other words, it refers to tendency to attribute the behavior of other people to the internal factors more than External factors (Green & Mitchell, 1979).

Example, if an employee is late for work, observer are more likely to conclude that the persons is lazy than to think that external factors may have caused this behavior.

According to Fred Luthans (2001), Mullins (1996), Daft (2008) in their respective empirical researches, fundamental attribution Error mainly occurs because we typically have limited information about the situational contingencies affecting other people. Meanwhile, the person performing the behavior is naturally, more sensitive to situational contingencies affecting that behavior. This can led to disagreement over the degree to which employees should be held responsible for their poor performance and absenteeism.

The observer blames the employee's lack of motivation or ability, whereas the employee does not feel responsible because behavior seems to be due to factors beyond his or her control.

(8) Self-serving Bias: This is the tendency to attribute our favourable outcomes to internal factors and our failures to external factors. Simply put, we take credit for our successes and blame others or the situation for our mistakes for example, in a unique study of corporate Annual Reports, researchers discovered that organization successes were typically explained by internal attribution such as management strategy, workforce qualities, and research/Development Efforts. But when explaining corporate problems, the Annual reports, relied more on External Attributions such as Bad weather, strong competition and inflationary pressures (Sherwood, 1981; Jones & George, 2006).

(9) Self-fulfilling Prophecies: According to Schermerhorn, Hunt and Osborn (2005), it is the tendency to create or find in another situation or individual that which one has expected to find.

Self fulfilling prophecy occurs when our expectations about another person cause that person to act in a way that is consistent with those expectations. In other words, our perceptions influence reality (Field & Van Seter's, 1988).

Self fulfilling prophecy is sometimes referred to as a "Pygmalion effect" named for a mythical Greek Sculptor who created a statue of ideal mate and then made her come to life. His prophecy can have both positive and negative results for you as a manager.

Supposing you assume that your subordinates prefer to satisfy most of their needs outside the work setting and want only minimal involvement with their jobs. Consequently, you are likely to provide simple, highly structured jobs designed to require little involvement. Subordinates response in this regard will be to show lack of commitment you assumed they would have in the first place. This is negative side of self fulfilling prophecy.

To creating positive self-fulfilling prophecies for employee:

(a) You create a warmer interpersonal climate between you and your subordinates.

(b) Give more performance feedback to subordinates—make it as positive as possible, given their actual performance.

(c) Spend more time helping subordinates to learn job skills.

(d) Provide more opportunities for subordinates to ask questions (Eden, 1984).

(10) Contrast Effects: This occurs when an individual's characteristics are contrasted with those of others recently encountered, who rank higher or lower on the same characteristics.

6. Attribution Theory in the Context of Perceptual Interpretations

Attribution is the process by which people interpret the perceived causes of behavior. Attribution theory is the attempt to understand the cause of an event, assess responsibility for outcomes of the events, and assess the personal qualities of the people involved.

The initiator of attribution theory is generally recognized as Heider (1958) who suggest that behavior is determined by a combination of perceived Internal forces and External forces.

- Internal forces relates to personal attributes such as abilities, skills, amount of effort or fatigue.
- External forces relates to environmental factors such as organizational rules and policies, the manner of superiors, or the weather.

Behavior at work may be explained by the locus of control, that is whether the individual perceives outcomes are controlled by themselves, or by External factors.

Judgments made about other people will also be influenced strongly by whether the cause is seen as internal or external.

In making attribution and determining whether an internal or External attribution is chosen, Kelly (1973) suggests three (3) basics criterias or dimensions of behavior. *Distinctiveness*, *Consensus* and *consistency*. These are factors that determine whether it is external or internally caused.

(a) Distinctiveness is determined by comparing a person's behaviours on one task with his behavior on other tasks.

High Distinctiveness implies that, the individual has performed the task in question significantly different in a manner that he has performed other task, i.e., if this performance level is not unusual it will be probably adjudged as internal.

(b) **Consensus** involves a comparison of an individual's behavior with that of his/her peers, i.e., if everyone who is faced with a similar situation responds in the same way. When consensus is high you will be expected to make external attribution and internal, if it is low.

(c) **Consistency** implies responding the same way over time. High consistency implies that a person perform a certain tasks the same way overtime.

Unstable performance for a given time would mean low consistency.

It is instructive to remember that consensus relates to other people, distinctiveness relates to other tasks and consistency relates to time.

In summary, Kelly hypothesized that people attribute behavior to external causes (environmental factors) outside their own control when they perceive high Distinctiveness, High Consensus and low consistency, and internal attribution is made when observed behavior is characterized by low distinctiveness, low consensus and high consistency.

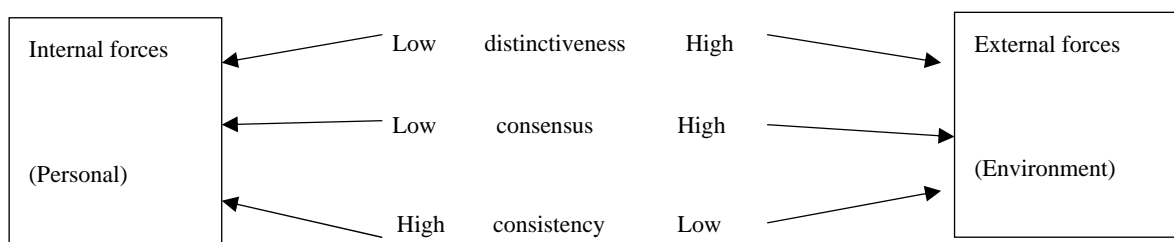


Figure 1 Representation of Attribution Theory

Source: Mullins L. J. (1996), *Management and Organizational Behaviour* (4th ed.); Washington, D. C.: Pitman Publishing.

7. Managing Perceptions in Organizations

As observed by Schermerhorn, Ihunt and Osborn (2005) to be successful, managers needs to understand the perceptual process, the stages involved, and the input the perceptual process can have on their own and either responses. They must also be aware of what roles the perceiver, the setting and the perceived have in the perceptual process. The following strategies needed to be given proper attention by organization in facilitating effective management of perception. They include:

(a) **Impression Management:** This is a person's systematic attempt to behave in ways that will create and maintain desired impression in the eyes of others. First impressions are especially important and influence how people respond to one another. Impression management is influenced by such activities as associating with the right people" doing favour to gain approval, flattering others to favorably impress them, taking credit for a favorable event, apologizing for a negative event while seeking a pardon, agreeing with the opinion of others, downplaying the severity of a negative event and doing favours for others.

According to Armstrong (2009) successful managers learn how to use these activities to enhance their own images, and they are sensitive to their use by their subordinates and others in their organizations.

(b) **Distortion Management:** This demands that, throughout the entire perception process, managers should be sensitive to the information distortions caused by halo effects, selective perceptions, projections, contrast effects and self fulfilling prophecies in addition to distortions caused by stereotypes and prototypes.

In the attention and selection stage of perceptual process, managers should be alert to balancing automatic and controlled information processing. Most of the responsibilities such as performance assessment and clear

communication, will involve controlled processing, which will take time away from other job responsibilities.

Along with other controlled processing, managers need to be concerned about increasing the frequency of observations and about getting representative information rather than simply responding to the most recent information about a subordinate or a production order.

For instances, same organizations have responded to the need for representative and more accurate information by utilizing current technology. In addition, managers should not fail to seek out disconfirming information that will help provide a balance to their typical perception of information.

The various kinds of schemes and prototypes and stereotypes are particularly important at the information organizing stage. Managers should strive to broaden their schemas (i.e., the cognitive framework that represents organized knowledge about a given concept or stimulus developed through experience) or should even replace them with more accurate or complete ones.

At the interpretation stage, managers need to be especially attuned to the impact of attribution on information. At the retrieval stage, managers should be sensitive to the fallibility of memory. They should reorganize the tendency to overly on schemes especially prototypes or stereotypes that may bias information storage and retrieval.

(c) Diversity Management: Companies acquire a more diverse workforce as they extend operations globally. The challenge for corporate leaders is to leverage the benefits of this diversity while minimizing the perceptual and behavioral problems that tend to accompany heterogeneity.

We see language differences, religious differences, the graying of the workplace. It is a business imperative to get people to work together. To get people to work together more effectively requires the introduction of diversity management programs. Typically, these training programs serve two purposes. First, they communicate the value of diversity, for example participants learn how a multicultural workforce potentially improves corporate decision making and customer service.

Second, diversity management programs helps participants become aware of their perceptual biases and gives them more accurate information about people with different backgrounds. Diversity management sessions are not intended to correct deep rooted prejudice or intolerance. In fact, they could make matters worse because highly prejudiced employees are likely to view these sessions as a form of coercion if they are required to attend them. Rather, they help employee learn, and eventually overcome, the more subtle forms of bias that emerge from distorted stereotypes.

In most organizations, diversity management programs mainly increase employee awareness of differences. More awareness can be helpful, but some experts are calling on companies to introduce the “next level”, that is, moving beyond awareness to a deeper level of understanding and sensitivity.

Again, encouragement of dialogue among employees from different cultural backgrounds in organization is pertinent. These groups meet regularly to discuss and learn to appreciate their differences (Robinson & Dechant, 1997; Keid, 1998.)

(d) Empathize with Others: According to Mcshane and Glinow (2007) diversity management programs should also involved learning how to empathize with people from different background.

Empathy refers to a person’s ability to understand and be sensitive to the feelings of others. This is particularly useful for reducing attribution errors because empathy makes us more sensitive to external causes of another person’s performance and behaviours.

Empathy comes naturally to some people. However, the rest of us can develop empathy skills by receiving

feedback on how well we seem to empathize.

Another approach is to work closely with others and spend time participating in their environment.

(e) Compare perceptions with Others: Another useful way to reduce perceptual bias is to compare our perceptions with the perceptions other people have about the same target. By sharing perceptions, we learn different points of views and potentially gain a better understanding of the situation.

If our Colleagues have different backgrounds but similar perceptions of the situation then there is reason to be more confident in our interpretations. Of course, there is no way to know for sure that our perceptions are correct, but they are less likely to be wrong if people with different backgrounds have the same general interpretation of the situation.

It could also be rewarding to emphasize that in effective perception management process, managers in organizations should practice transparency, be consistent in their dealings, be honest, practice fairness/equity, give training and orientations to employees, give adequate counselling, facilities top down communication as much as possible, and ensure that they monitor operations as much as possible and above all practice empathy.

8. Research Methodology

The research design adopted in this investigation was largely Quasi Experimental in the sense that it placed the premium on simple survey. The population of the study consisted of seven (7) companies namely Nigeria Bottling company Plc (NBC) with management population of 900, Guinness Nigeria Plc with management population of 436, Seven Up Bottling company with management population of 380, Flour Mills Nigeria Plc with management population of 237, Nigerian Breweries Nigeria plc Iganmu, Lagos with management population of 144, consolidated Breweries with a management population of 184 and Friesland foods (WAMCO) Nigeria Plc Lagos, with management population of 186 staff as at December, 2014. These all together make a total management staff population size of 2467.

The selection of the companies is from Breweries and Food /others Beverage sector. This selection is bordered on factors such as size, (Bigger, moderate and smaller in size), age and assets base /scope of operations. The choice of the companies employed the use of *disproportionate stratified sampling technique* in which the companies are classed into two (2) strata. The first category of organizations are bigger in size in terms of employees, scope of operations and assets base. They have population of management staff above 200.

The second category of organizations are moderately bigger in size in terms of employees, scope of operations and assets base. They have a management staff population of between 100-199.

Primary source of data collection especially questionnaire, i.e., 5 point likert rating scale questionnaire Strongly agree (SA), Agree (A), Undecided (U), strongly disagree (SD) and disagree (D) is administered to obtain viable information on the subject matter of perception management as a strategy for productive managerial performance enhancement in the 7 companies.

To scientifically generate a sample size, the Taro Yamane's (1964) formula was applied. According to Baridaim (2001) this formula can be used for a homogenous population like the one in this research. The formula is stated below:

$$n = \frac{N}{1 + N(e)^2}$$

Where,

n = Sample Size

e = Level of Significance

N = Population size

I = Constant value

A total population size of 2467 was used to obtain the sample size of seven (7) companies in the study at 0.05 level of significance as shown below:

$$n = \frac{2467}{1 + 2467(0.05)^2}$$

$$n = \frac{2467}{1 + 2467(0.0025)}$$

$$n = \frac{2467}{1 + 6.1675}$$

$$n = \frac{2467}{7.1675}$$

$$n = 344.1925358$$

$$n = 344$$

From the total sample size, the individual company's sample size is calculated. The formulae applied was Bowley's population allocation formulae (1964) in Nzealibe (1999:201) as shown below;

$$nh = \frac{nNh}{N}$$

Where nh = The number of units allocated to each company

n = The total sample size

Nh = The number of employees in each company

N = The population size.

Following the Bowleys allocation formulae, the individual company sample size is derived as follows:

Table 1 Number of Organizations/Firms based on Classification

| S/No | Name of Manufacturing Company | Population of Management Staff | Selected Sample Size |
|---|---|--------------------------------|----------------------|
| First Category of Organization (Management Staff above 200 bigger in size in term of Employee, Scope of Operation and Assets Base) | | | |
| 1 | Nigeria Bottling Company (NBC) Plc Lagos | 900 | 125 |
| 2 | Guinness Nigeria Plc Lagos | 436 | 61 |
| 3 | Seven Up Bottling Company Plc Lagos | 380 | 53 |
| 4 | Flour Mills Nigeria Plc Lagos | 237 | 33 |
| | Total | | 282 |
| Second category of Organization (management Staff between 100-199 or less than 200, moderately Bigger in size in term of employee, scope of operations and Assets Base) | | | |
| 5 | Nigeria Breweries Plc Lagos | 144 | 20 |
| 6 | Consolidated breweries Plc Lagos | 184 | 26 |
| 7 | Friesland Foods (WAMCO) Nigeria Plc Lagos | 186 | 26 |
| | Total | 2467 | 344 |

Source: Company's Records and Field Survey, 2014)

$$\text{For Nigeria Bottling Company Plc} = \frac{344 \times 900}{2467} = 125.4965 = 125$$

$$\text{For Guinness Nigeria Plc Lagos } N_2 = \frac{344 \times 436}{2467} = 60.79610 = 61$$

$$\text{For Seven Up Bottling Company Plc Lagos } N_3 = \frac{344 \times 380}{2467} = 52.98743 = 53$$

$$\text{For Flour Mills Nigeria Plc Lagos } N_4 = \frac{344 \times 237}{2467} = 33.04742 = 33$$

$$\text{For Nigeria Breweries Plc Lagos } n_5 = \frac{344 \times 144}{2467} = 20.07944 = 20$$

$$\text{For Consolidated Breweries Plc Lagos } n_6 = \frac{344 \times 184}{2467} = 25.65707 = 26$$

$$\text{For Friesland Foods (WAMCO) Plc Lagos } n_7 = \frac{344 \times 186}{2467} = 25.93595 = 26$$

Based on the researchers classification on strata, the companies with management population above 200, larger scope of operations and assets base and quality includes; Nigeria Bottling Company Plc, Guinness Nigeria Plc, Seven Up Bottling Company Plc, Flour Mills Nigeria Plc Lagos.

The companies with management population between 100-199 includes Nigeria Breweries Plc, Consolidated Breweries Plc and Friesland Foods (WAMCO) Plc Lagos. They are moderately bigger in size in term of employee, scope of operation and assets base.

The researcher also adapted the use of ANOVA (Analysis of Variance for the test of the 3 formulated hypotheses.

9. Data Presentation and Analysis

Table 2 Respondent Opinion on Troublesome Errors, Biases and Distortions in Perception Are Responsible for Poor Quality Decision Making and Judgments in Organizations

| Statement | Category of Organization | Degree of Respondents by Management Staff | | | | | |
|---|-------------------------------------|---|----|---|---|----|-------|
| | | SA | A | U | D | SD | Total |
| Troublesome errors, Biases and distortions in perception are responsible for poor quality decision making and judgments in organizations (i.e., stereotyping, halo effect error, selective perceptions, self serving bias, attribution errors primary effect, effect error etc) | Nigeria Bottling Company Plc Lagos | 62 | 54 | 0 | 5 | 4 | 125 |
| | Guinness Plc Lagos | 34 | 22 | 0 | 0 | 5 | 61 |
| | Seven Up Bottling Company Plc Lagos | 26 | 23 | 0 | 4 | 0 | 53 |
| | Flour Mills Nigeria Plc Apapa Lagos | 15 | 14 | 2 | 0 | 2 | 33 |
| | Nigeria Breweries Plc, Lagos | 10 | 8 | 0 | 2 | 0 | 20 |
| | Consolidated Breweries Plc Lagos | 12 | 11 | 0 | 0 | 3 | 26 |
| | Friesland Foods (WAMCO) Plc Lagos | 12 | 12 | 0 | 2 | 0 | 26 |

Source: Field Survey 2015.

As data shown in Table 2 above, it is clearly shown that troublesome errors biases and distortions in perception such as stereotyping, Italo effects errors, selective perception, fundamental attribution errors, self serving biases, primary effect error, recency effect error amongst, others are responsible for poor quality decision making and judgment in organization

For Nigeria Bottling company (NBC) Plc Lagos 116 out of 125 respondents (92.8%) felt strongly that the above mentioned errors are responsible for distortions in perceptions and bad judgments in organizations. Only 9 out of 125 respondents (7.2%) felt otherwise.

As for Guinness Nigeria Plc Lagos 56 out 61 respondents (91.8%) consensually upheld the notion that troublesome errors, biases and distortion in perception affects quality decision making and judgments. Only 5 out

of 61 respondents disagreed on this position.

For Seven Up Bottling Company Plc Lagos, the consensus view among the majority of respondents is that perception is distorted by troublesome errors and biasness of mind. Out of a total of 53 respondents, 49 (92.45%) subject felt so. Only 4 (7.55%) which constitute a negligible proportion or percentage felt otherwise.

In Flour Mills of Nigeria Plc Apapa, Lagos for most of the respondents, perception is highly distorted by errors such as stereotyping, self serving biases, attribution errors, contrast effect amongst others. As shown in the Table 2, 29 out of 33 respondents (or 87.88%) were of this notion. Only 4 (12.12%) respondents were undecided and strongly disagreed.

As for the Nigeria Breweries Plc Lagos, for most of the respondents, poor quality decision making and judgments which is a vital element of management is as a result of troublesome errors, biases and distortions in Perception. As shown in the Table 2, 18 out of 20 respondents (90%) upheld this notion. Only 2 (10%) felt the opposite.

For consolidated Breweries Plc Iddo- Lagos 23 out of 26 respondents (or 88.46%) exhibit agreement. Only 3 respondents (or 11.54%) revealed strongly disagreed.

For respondents in Friesland Foods (WAMCO) Plc Lagos, the Information indicated as per data obtained is Table 2 above imply that errors distorts perception of reality and affects quality sound decision making process. 24 (92.31%) of respondents agree to other notion while 2 (or 7.69%) felt otherwise.

Table 3 Respondents View on the Main Sources of Errors in Person's Perception

| Statement | Category of Organizations | Degree of Response by Management Staff | | | | | |
|--|--|--|----|---|---|----|-------|
| | | SA | A | U | D | SD | Total |
| The main sources of errors in Managers/Person's Perceptions may include not collecting enough information basing our judgments on irrelevant information, seeing what we expect to see and not investigating further amongst others in Organizations | Nigeria Bottling Company Plc Lagos | 54 | 52 | 3 | 7 | 9 | 125 |
| | Guinness Nigeria Plc Lagos | 26 | 24 | 0 | 6 | 5 | 61 |
| | Seven – Up Bottling Company Plc- Lagos | 23 | 22 | 2 | 4 | 2 | 53 |
| | Flour Mills Nigeria Plc Apapa Lagos | 14 | 15 | 0 | 0 | 4 | 33 |
| | Nigeria Breweries Nigeria Plc, Lagos | 9 | 9 | 0 | 2 | 0 | 20 |
| | Consolidated Breweries Plc Lagos | 12 | 10 | 3 | 3 | 0 | 26 |
| | Friesland Foods (WAMCO) Plc Lagos | 12 | 12 | 0 | 0 | 2 | 26 |

Source: Field Survey (2015).

For most of the respondents in Nigeria Bottling Company (NBC) Plc, Lagos the main sources of Errors in Managers/Employees perceptions may be as a result of not collecting enough information, basing our judgment on irrelevant information, seeing what we want to see and not investigating further amongst others in organizations. In fact, 106 out of 125 respondents (or 84.8%) exhibit agreement. 16 subject out of 125 (or 12.8%) showed disagreement. Only 3 out of 125 respondents (or 2.4%) reveals undecided.

There has been unanimous views among the respondents as indicated in Table 3. 50 out of 61 respondents (or 81.97%) felt that the reasons for sources of perceptions agree with the stated positions. Only 11 out of 61 (18.03%) exhibit disagreement on this opinion in Guinness Nigeria Plc Ikeja- Lagos.

For the Seven Up Bottling Company Plc Lagos 45 out of 53 subjects (or 84.91%) either agree or strongly agree with the stated notion. Only 6 out of 53 respondents (that is 11.32%) either disagree or strongly disagree. In fact 2 out of 53 (or 3.77%) were undecided on this subject matter.

For Flour Mills Nigeria Plc, Apapa Lagos, 29 out of 33 respondents (or 87.91%) favourably exhibit agreement on the position. 4 out of 33 respondents (or 12.12%) showed disagreement on this notion.

For Nigeria Breweries Plc Iganmu – Lagos – 18 out of 20 subjects (90%) either agree and strongly agreed. 2 out of 20 respondents (10%) disagree on this notion.

For Consolidated Breweries Plc Iddo-Lagos majority of the respondents opted for agree and strongly agree. 22 out of 26 respondents (or 84.61%) exhibited agreement. 3 out of 26 (or 11.54%) were undecided on this position while 3 out of 26 (or 11.54%) Disagreed out rightly.

For Friesland Foods (WAMCO) Ikeja-Lagos, 24 out of 26 respondents (or 93.31%) revealed agreement while 2 out of 26 respondents (7.69%) revealed strongly disagree.

Table 4 Respondents Opinion on Factors Influencing Perception of Reality

| Statement | Category of Organizations | Degree of Response by Management Staff | | | | | |
|--|---|--|----|---|---|----|-------|
| | | SA | A | U | D | SD | Total |
| Several factors are influencing perception of reality. Such as perceiver (i.e attitudes, motives, interest, past experience and expectations), Target (i.e motion, size, sound(and situation (i.e timing, background) | Nigeria Bottling Company Plc Lagos | 60 | 60 | 0 | 5 | 0 | 125 |
| | Guinness Nigeria Plc Lagos – Ikeja | 28 | 27 | 0 | 0 | 6 | 61 |
| | Seven – Up Bottling Company Plc- Lagos | 27 | 22 | 0 | 4 | 0 | 53 |
| | Flour Mills Nigeria Plc Apapa Lagos | 17 | 13 | 0 | 0 | 3 | 33 |
| | Nigeria Breweries Nigeria Plc Iganmu- Lagos | 10 | 7 | 3 | 0 | 0 | 20 |
| | Consolidated Breweries Plc Iddo- Lagos | 11 | 11 | 0 | 4 | 0 | 26 |
| | Friesland Foods (WAMCO) Plc Ikeja-Lagos | 12 | 12 | 0 | 0 | 2 | 26 |

Source: Field Survey, (2015).

As for the data shown in Table 4 above, the overwhelming majority, revealed agreement on the subject matter. 120 out of 125 respondents (or 96%) confirmed that several factors from the perceivers (i.e., attitudes, motives, interest, past experiences and expectations), from the target (i.e., sound, Size and motion) and from the situation (i.e., the timing, the background are influencing perception of reality only 5 out of 125 respondents (or 4%) had opposite opinion.

For the Guinness Nigeria Plc, Lagos, 55 out of 61 respondents (or 90.16%) either agree and strongly agree on the notion, 6 out of 61 respondents (or 9.84%) strongly disagrees.

In the Seven Up Bottling Company Plc Lagos, 49 out of 53 subject (or 92.45%) exhibit agreement. Only 4 out of 53 respondents (or 7.55%) had a contrary opinion of disagreement.

For Flour Mills Nigeria Plc Lagos, 30 out of 33 respondents (or 90.91%) either agree or strongly agree. Only 3 out of 33 respondents (or 9.09%) showed strongly disagree,

For the Nigeria Breweries Plc, Lagos, 17 out of 20 respondents (or 85%) either agree or strongly agree. Only 3 out of 20 respondents (or 15%) were undecided on this notion.

For consolidated Breweries Plc, Lagos, 22 out of 26 respondents (or 84.62%) exhibit agreement. 4 out of 26 respondents (15.38%) revealed disagreement.

In the Friesland Foods Plc, Lagos, 24 out of 26 respondents (or 92.31%) either agree or strongly agree. Only 2 out of 26 respondents (7.69%) strongly disagreed.

As for the data shown in Table 5, it is revealing that there exist strategies that are adapted by managers in managing perception in organizations. These strategies include managing of impression, managing of distortions perceptual/errors in organizations, managing diversity, empathizing with other employees in organization.

Table 5 Respondents Views on the Strategies for Managing Perception

| Statement | Category of Organizations | Degree of Response by Management Staff | | | | | |
|--|---|--|----|---|---|----|-------|
| | | SA | A | U | D | SD | Total |
| Strategies for Managing perception in organization ranges from managing impression, Distortions, diversity, empathizing with others and comparing perception with others | Nigeria Bottling Company Plc Lagos | 65 | 55 | 0 | 0 | 5 | 125 |
| | Guinness Nigeria Plc Lagos – Ikeja | 27 | 24 | 0 | 8 | 0 | 61 |
| | Seven – Up Bottling Company Plc- Lagos | 25 | 26 | 2 | 0 | 0 | 53 |
| | Flour Mills Nigeria Plc Apapa Lagos | 16 | 4 | 0 | 0 | 3 | 33 |
| | Nigeria Breweries Nigeria Plc Iganmu- Lagos | 6 | 10 | 0 | 2 | 2 | 20 |
| | Consolidated Breweries Plc Iddo- Lagos | 11 | 12 | 3 | 0 | 0 | 26 |
| | Friesland Foods (WAMCO) Plc Ikeja-Lagos | 11 | 11 | 0 | 2 | 2 | 26 |

Source: Field Survey, (2015).

For the Nigeria Bottling Company Plc (NBC) Lagos, 120 out of 125 respondents (or 96%) either agree or strongly agree. Only 5 out of 125 respondents (4%) strongly disagree with the notion.

For the Guinness Nigeria Plc, Lagos, 53 out of 61 respondents (86.89%) either agree or strongly agree on the position. Only 8 out of 61 respondents (or 13.11%) Disagree on the matter.

In Seven Up Bottling Company Plc Lagos, 51 out of 53 respondents (96.23%) either agree or strongly agree on this position. 2 out of 53 respondents (3.77%) had a contrary opinion and opted for undecided.

For the Flour Mills Plc Lagos, 30 out of 33 respondents (90.91%) either agree or strongly agree on this notion. 3 out of 33 respondents (or 9.09%) strongly Disagree.

For Nigeria Breweries Plc Lagos, 16 out of 20 respondents (80%) either agree or strongly agree.. 4 out of 20 respondents (or 20%) reveals either disagree or strongly disagree.

For Consolidated Breweries Plc, Lagos, 23 out of 26 respondents (or 88.46%) exhibits overwhelming agreement. Only 3 out of 26 respondents (or 11.54%) were undecided on the subject matters.

For Friesland Foods (WAMCO) Plc, Lagos, 22 out of 26 respondents (or 84.62%) either agree or strongly agree. Only 4 out of 26 respondents (or 15.38%) either disagree and strongly disagree.

10. Testing of Hypothesis

Hypothesis 1: There are no significant troublesome errors, biases and distortion in perception responsible for poor quality decision making process and judgment in manufacturing organization in Nigeria.

| ANOVA | | | | | |
|-----------------|----------------|-----|-------------|-------|------|
| Decision Making | | | | | |
| | Sum of Squares | Df | Mean Square | F | Sig. |
| Between Groups | 18.887 | 4 | 4.722 | 4.579 | .001 |
| Within Groups | 349.552 | 339 | 1.031 | | |
| Total | 368.439 | 343 | | | |

If the significant value is less than ($<$) 0.05 then the null hypothesis should be rejected. And in this case, the significance value is 0.001 which is less than the alpha value of 0.05. Therefore, the null hypothesis is rejected. This is implying that there are troublesome error, biases, distortions in perceptions responsible for poor quality decision making processed judgment in manufacturing organization in Nigeria affecting productivity and quality performance resulting to low profit attainment.

Hypothesis 2: There are no significant factors, influencing perception of reality such as attitude, motives,

Perception Management: A Strategy for Effective Decision Making and Productive Managerial Performance in Business Organizations: A Survey of Selected Manufacturing Firms in Nigeria

interest, expectations amongst others affecting performance in manufacturing organizations in Nigeria.

| ANOVA | | | | | |
|------------------------------|----------------|-----|-------------|-------|-------|
| Performance of organizations | | | | | |
| | Sum of Squares | Df | Mean Square | F | Sig. |
| Between Groups | 28.334 | 4 | 7.084 | 5.817 | 0.000 |
| Within Groups | 412.779 | 339 | 1.218 | | |
| Total | 441.113 | 343 | | | |

An ANOVA was used to test if there are significant factors, influencing perception of reality such as attitude, motives, interest, expectations amongst others affecting performance in manufacturing organizations in Nigeria. A significant value of 0.000 was obtained which is less than 0.05 alpha value. The null hypothesis is hereby rejected signifying that there are numerous factors affecting perception of reality in organization.

Hypothesis 3: There are no significant strategies for effective management of perception in manufacturing organizations in Nigeria that have enhanced performance.

| ANOVA | | | | | |
|------------------------------|----------------|-----|-------------|--------|-------|
| Performance of organizations | | | | | |
| | Sum of Squares | Df | Mean Square | F | Sig. |
| Between Groups | 66.649 | 4 | 16.662 | 14.988 | 0.000 |
| Within Groups | 376.860 | 339 | 1.112 | | |
| Total | 443.509 | 343 | | | |

An ANOVA was used to test if there were significant strategies for effective management of perception in manufacturing organizations in Nigeria that have enhanced performance. A significant value of 0.000 was obtained and this is less than the alpha value of 0.05. the null hypothesis is hereby rejected signifying that there a significant strategies for effective management of perception in manufacturing organizations in Nigeria that have enhanced performance. These strategies for managing perception include impression management, distortion management, diversity management, sympathizing with others and comparing perception with others.

11. Discussion of Findings

Interestingly, the study has produced startling discoveries as evident from the data presentation and analysis above.

First and foremost, the study found that the troublesome errors, perceptual distortions, biases in perception namely fundamental attribution error, self serving biases, primacy effect error, recency effect error, stereotyping error, Halo effect error, projection, contrast effect error, self fulfilling prophecy amongst others are responsible for poor quality decision making process and judgment in Nigeria manufacturing organizations. This has affected quality performance leading to decline in profit attainment.

The implication of the above scenario is that executive management of manufacturing organizations needs to adopt the following remedies in bailing their firms from the biases. These remedies include

- (1) Collecting and consciously using more information about other people to facilitate sound judgment and decision making process.
- (2) Taking more time and avoiding instant and “Snap” judgment about others.
- (3) Developing self-awareness and an understanding of how our personal biases and preferences affects our

perceptions and judgments of other people.

(4) Checking our attributions – the assumptions we make about the causes of behavior, particularly the links we make between aspects of personality and appearance on the one hand and behavior on the other hand.

The above views agrees with those of Buchanan and Huczynski (2004), Mullins (1996), Sev (2006), Robis (1998) who hold the same opinion that, adopting the above will help the troublesome errors, biases and perceptual distortions that confronts managers in decision making process and judgment in organizations.

Secondly, the study found that several factors influence perception of reality from the perceivers view point such as; attitudes, motives, interest, experiences and expectations from the target view point such as; novelty, motion, sounds, size, background and proximity and finally from the situation point of view such as time, work setting and social settings, this views is supported by Robbins (1998), Wright and Noe (1995), Mcshene and Glinad (2000) in their respective findings.

Thirdly, the study also reveals that several strategies are adopted by manufacturing organizations in Nigeria for effectively managing the perception of managers in order to enhance performance. This agrees with the views of Mcshane and Glinow (2000), Schermerhorn, Hunt and Osborn (2005), Mullins (1996), who confirms that strategies for managing perception includes; impression management of the self and others, being sensitive to effects of the common perceptual distortions, diversity management programs, empathize with others, postpone impression formation, compare perception with others amongst others.

The implication of this is that Executive Management should ensure that reasonable awareness and campaigns are carried out to ensure the success of perception management in organizations.

More so, the Executive Management should endeavour to know the main sources of the errors of the person perception to facilitate its effective management in the organization. This will aid effective decision making process and sound judgment by the organizational members and eventually lead to productivity.

12. Recommendations

(1) Managers of manufacturing firms in Nigeria needs a constant training, mentoring and orientations on how to be transparent in their transactions and dealings with clients, subordinates, colleagues supervisor and necessary stakeholders to the organizations in order to attain high performance trends. This will aid perception management.

(2) Application of equitable procedures, and fairness in workplace in order to uphold honesty, integrity, social norms and values of the society by organizational members is pertinent. This will accelerate productivity if judiciously adopted.

(3) Managers of manufacturing organizations needs to rethink their attitudes, motives, interest, past experiences and expectations to ensure that there is no disharmony with organizational objectives and goals of quality production, services and high profit attainments.

This is in agreement with one of Henri Fayol principle of Management — Father of Administrative Management which states that “subordination of individual interest to the common good” this is implying that interests of individuals should not be placed before the goals of the overall organization. Judicious application of this will aid perception Management of organization.

(4) Empathizing with fellow colleagues, subordinates managers should be a pivotal principle to catalyzed management of perception if goals of the organization such as high productivity, and high performance are to be attained.

(5) Careful Management of Diversity of employees cultures, Nationality, Race, Religious affiliations, ethnic and tribal differences is pertinent. Harmonization of these elements in organizations will facilitate the repositioning of the perception, giving rise to productive work setting/environment that will result to high profit attainment.

(6) Proper Brainstorming and thinking before embarking on any action and managerial decision to avoid haphazard judgments, errors, and biases in perceptions, such as stereotyping, Halo effect error, selective perception, fundamental attribution error, self serving biases, contrast effect error, projection error, primacy error and Regency effect error is necessary.

(7) Carefully learning how to use impression management strategies such as;

(a) First Impression

(b) Association with right people

(c) Apologizing for a negative event while seeking a pardon.

(d) Agreeing with right opinion of others

(e) Downplaying the severity of a negative event and doing favours to others,

Should be used by managers of Business organizations in order to enhance their images in the organizations.

(8) Adequate counseling by Executive Management to the employees/subordinates on to how to enhance smooth cordial working relationships within organizations and to facilitate relationships with the pertinent stakeholders within and outside the organizations should be encouraged.

Executive management of organizations should ensure that there are consistent adoption of rules and regulations that facilitates top down communication as much as possible to all employees without discrimination to all departments of the organization at all times.

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Perception Management: A Strategy for Effective Decision Making and Productive Managerial Performance in Business Organizations: A Survey of Selected Manufacturing Firms in Nigeria

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**Appendix
Questionnaires**

Here is a questionnaire on perception management: A Strategy for effective Decision making and Productive Managerial Performance in Business Organizations. A survey of Selected Manufacturing firms.

You have been chosen as one of the respondents in this study. You are therefore humbly requested to supply honest and sincere answers and responses to questions by tick (as appropriately as you can in the boxes/spaces provided).

| S/No | Statement | SA | A | U | SD | D |
|------|--|----|---|---|----|---|
| 1 | There are troublesome errors, biases and distortions in perception responsible for poor quality decision making and judgment in organizations (i.e., stereotyping, Halo Error, Self serving biases, primacy errors, attribution errors, selective perception amongst others. | | | | | |
| 2 | The main sources of errors in persons perceptions may include not collecting enough information, basing our judgment on irrelevant information, seeing what we expect to see and what we want to see and not investigating further amongst others. | | | | | |
| 3 | There exist several factors influencing perception of reality such as attitude, motives, interest, past experience, expectations, background, motion, sound amongst others. | | | | | |
| 4 | Strategies for managing perception ranges from managing impression, distortion management, diversity management, empathizing with others and comparing our perception with others amongst others. | | | | | |

Contingent Valuation Method (CVM) for Agricultural Wastes in Greece

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Abstract: This paper focuses on investigating the tendency of farmers in the greater area of Thessaloniki as well as those on the islands of Samos and Ikaria to participate in a program of environmental management. The aim is to investigate the level of amount WTA against which the farmers would be willing to allow anyone to gather and carry away the leftovers of their farming exploitation. To serve the above goals, the agricultural leftovers are evaluated by the Contingent Valuation Method (CVM) as an environmental non-market economic commodity. By the term Biomass we mean the biodegradable products fraction, wastes and leftovers coming from agricultural, plants and animal substances inclusive, the forestall and the like industrial plant, as well as the biodegradable fraction of industrial wastes and urban effluents and sewage wastes.

Key words: willingness to accept; WTA; biomass; ordinal model; parametric approach; questionnaire

JEL code: Q5

1. Introduction

The Contingent Valuation Method (CVM) is a survey-based technique, frequently used in Experimental Economics, especially useful for the valuation of non-market resources/goods/services, and cultural heritage objects (of aesthetic, historic, scientific or social value), such as conservation of monumental remains and preservation of the physical and anthropogenic environment (Bedate A., Herrero L. C. & Sanz J. A., 2004; Hanemann W. M., 1991). The basic partial techniques used in CVM are (1) willingness to pay (WTP), which is the maximum monetary amount that an individual would pay to obtain/preserve a good, and (2) willingness to accept (WTA) compensation, which is the minimum monetary amount required to relinquish the good. Therefore, WTP provides a purchase price, relevant for valuing the proposed gain of the good while WTA provides a selling price, relevant for valuing the proposed loss of the good. According to classic economic theory, a significant difference between WTP and WTA should not occur, on condition that there is (1) no transaction cost, (2) perfect information about goods/services and corresponding prices, (3) no income effect, (4) a market that engenders truthful revelation of preferences. Although these conditions were generally met in several economic experiments that used inexpensive market goods with readily available substitutes, the ratios WTA/WTP obtained were significantly greater than unity. This result was attributed to the fact that participants in these experiments lacked market experience (Bateman I., Munro A., Rhodes B., Starmer C. & Sugden R., 1997). Contingent Valuation Method is the first technique of hypothetical

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experiments using a questionnaire applied to assess the economic value of public goods and services and is the predominant assessment technique in the scientific field of Experimental Economics.

The economic value of natural resources is often defined as the value of the goods and the services they offer. The environment economics have developed a series of methods for assessment of the monetary price of the environmental goods and services, which are based on investigation of the public preferences and reflect the practical need of translation of the monetary amount into management policies, in which the public concession and participation in the process of decision making are indispensable.

By the term Biomass we mean the biodegradable products fraction, wastes and leftovers coming from agricultural, plants and animal substances inclusive, the forestall and the like industrial plant, as well as the biodegradable fraction of industrial wastes and urban effluents and sewage wastes.

2. Implementation

We compare the results of the descriptive statistical analysis among the answers of the interviewees in the mainland Greece (Thessaloniki) and on two Greek islands — Samos and Ikaria. The similarities and differences in the attitude of these two categories of rural population are outlined. We observe that the interviewees in the previous year owned bigger areas of land (more stremmas) per cultivated item on Samos and Ikaria compared to Thessaloniki. Also the interviewees stated that they had almost the same number of stremmas against the average stremmas owned by the farmers in Thessaloniki, on Samos and on Ikaria. Most of the interviewees in Thessaloniki utilize the crop leftovers in other applications but on Samos and on Ikaria they gather it for fuel at home. It is worth noting that management of the rejected biomass does not differ among the above areas.

On the contrary, however, we notice that the minimum compensation amount each interviewee asks in order they may be in a position to gather and carry away the leftovers differs among the areas. More specifically on Samos and on Ikaria the farmers ask for higher remuneration compared to farmers in the Thessaloniki area. However, the willingness shown by the farmers for participation in gathering the crops without any extra remuneration does not differ among the areas.

As regards the income of each interviewee farmer against that of inhabitants in other areas of similar agricultural exploitation it does not differ between the two area categories, as the results show. Additionally we notice that the percentage of the interviewees' income originating in farming is bigger in Thessaloniki compared to that on Ikaria and on Samos. In order we correlate the amount WTA with the rest of the parameters of our example, we apply the model "ordinal regression", given that the dependent variable (WTA) is scaled and the independent variables are discreet (nominal or scaled).

We conclude that the minimum amount each interviewee is willing to accept as minimal remuneration, is affected by the way these biomass leftovers are managed, the age of the interviewees and the area in which they live. Those interviewees who use such biomass leftovers in alternative applications wish to be remunerated higher compared to those who relinquish such leftovers.

The interviewees aged 15 to 25 years wish to be remunerated with smaller amounts compared to those aged 56 up ($p\text{-value} = 0.045 < 0.05$). Further, we notice that the farmers aged 26 to 40 years wish to be remunerated with higher amounts compared to those of 56 years up ($p\text{-value} = 0.018 < 0.05$). Finally, the interviewees in the Thessaloniki area wish to be remunerated with smaller amounts compared to those on the islands of Samos and Ikaria.

The ordinal logistic model is listed in a broader category of Generalized Linear Models for arrangement data. The model is based on the assumption that a latent continuous outcome variable exists and that the observed ordinal outcome results from the continuous discreteness of that subjected to j scaled groups.

The specimen of generalized linear models is given here:

$$\text{link}(\gamma_j) - \frac{\theta_i - [\beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k]}{\exp(\tau_1 z_1 + \tau_2 z_2 + \dots + \tau_m z_m)} \quad (1)$$

Where:

γ_i : cumulative possibility for category j

θ_j : threshold of category j

$\beta_1 \dots \beta_k$: reciprocation coefficients

$x_1 \dots x_k$: predictor variables

k : number of predictions

The specimen numerator determines the location of the model while the denominator determines the scale. The terms $\tau_1 \dots \tau_m$ are coefficients for the scale components while the terms $z_1 \dots z_m$ represent the m predictor variables for the scaled components. The scaled components are the cause of differences in the variable of different values of the predictor variables.

The question formulates the Willingness to Accept (WTA) of the interviewee that is their wish for remuneration in order to allow someone to gather and take away the leftovers of the agricultural exploitation. It is impressive that the majority of the interviewees, i.e., 71.7% of the specimen, answered that they would relinquish their farming leftovers without asking for any monetary remuneration. Out of the remaining 28.3% of the specimen, 11.7% answered that they would ask for 1-5 euro to relinquish the farming leftovers in each cultivated stremma on a yearly basis. Similarly another 11.7% of the specimen answered that they would ask for 6-10 euro for the same above reason. Finally, one person in each category (1.67% of the specimen), answered that the remuneration he would ask to relinquish his farming leftovers would be 11-15 euro in the first instance, 16-20 euro in the second instance and 21 euro up in the last instance.

We observe that in the first category, that is the one of those stating that they do not ask for any remuneration to relinquish their farming leftovers, 58.1% of the specimen would participate without any recompense in the entire process, while 41.8% would not participate without recompense.

In the second category, that is the one of those wishing to collect monetary remuneration to relinquish their farming leftovers, 47% of the specimen answered that they would participate in the relevant procedure, contrary to the 52.9% of the interviewees who stated that they would not participate.

In the first category, i.e. those who stated that they do not wish any remuneration to relinquish their farming leftovers, 58.1% of the specimen would participate in the whole procedure without recompense while 41.8% would not participate without recompense.

In the second category, i.e. those wishing to collect monetary remuneration to relinquish their farming leftovers, 47% of the specimen answered that they would participate in the relevant procedure, but 52.9% of the interviewees stated that they would not participate.

Out of the first category which concerns those not wishing remuneration to relinquish their farming leftovers, 26% of the specimen stated that they abandon their farming leftovers in the field. An equal percentage (26%) states that they burn the leftovers in the field. Only 2.3% gather the leftovers as fuel at home while, finally, the majority

that totals 45.2% mention another utilization.

Out of the second category, which concerns those wishing remuneration to relinquish their farming leftovers, 26% of the specimen stated that they abandon the leftovers of their farming exploitation in the field.

Out of the first category, i.e., those stating that they do not wish any remuneration to relinquish their farming leftovers, 18.6% of the specimen report an income smaller of the average of the farmers in the area who are involved in similar farming exploitation, 67.4% of the specimen report an income approximately equal to the average and finally only 13.9% of the interviewees report an income bigger than the average in the area.

Out of the second category, that is the one wishing to collect monetary remuneration to relinquish their farming leftovers, 23.5% of the specimen report an income smaller than the average of the farmers in the area with similar farming exploitation, 47% of the specimen report an income approximately equal to that of the average and finally only 29.41% of the interviewee report an income bigger than the average in the area.

$$R^2 = 1 - \frac{\sum_{i=1}^N (y_i - \hat{y}_i)^2}{\sum_{i=1}^N (y_i - \bar{y})^2} \quad (2)$$

Where N is the number of observations, y is the dependent variable, \bar{y} is the mean of the y values, and \hat{y} is the value predicted by the model. R^2 is the determination coefficient that ranges from 0 to 1. According to the Ephron's R^2 :

$$R^2 = 1 - \frac{\sum_{i=1}^N (y_i - \hat{\pi}_i)^2}{\sum_{i=1}^N (y_i - \bar{y})^2} \quad (3)$$

Where $\hat{\pi}$ = model predicted probabilities, the dependent variable in a logistic regression is not continuous while the predicted value (a probability) is. Mac Fadden introduced the log likelihood of the intercept model.

$$R^2 = 1 - \frac{\ln \hat{L}(M_{Full})}{\ln \hat{L}(M_{Intercept})} \quad (4)$$

$$2 \ln [L(M_{Intercept}) / L(M_{Full})] \quad (5)$$

Where Mc Full is the model with predictors, M Intercept is the model without predictors, and \hat{L} is the estimated likelihood. A likelihood falls between 0 and 1, so the log of likelihood is less than, or equal to, zero. If a model has a very low likelihood, then the log of the likelihood will have a larger magnitude than the log of a more likely model. Cox and Snell present the R^2 as a transformation of the

Statistic that is used to determine the convergence of a logistic regression.

$$R^2 = 1 - \left\{ \frac{L(M_{Intercept})}{L(M_{Full})} \right\}^{\frac{2}{N}} \quad (6)$$

Note that Cox & Snell's pseudo- R^2 has a maximum value that is not 1; if the full model predicts the outcome perfectly and has a likelihood of 1, and then we have

$$1 - L(M_{Intercept})^{\frac{2}{N}} < 1 \quad (7)$$

Nagelkerke, Cragg and Uhler, adjust Cox & Snell's R^2 so that the range of possible values extends to 1.

$$R^2 = \frac{1 - \left\{ \frac{L(M_{Intercept})}{L(M_{Full})} \right\}^{\frac{2}{N}}}{1 - L(M_{Intercept})^{\frac{2}{N}}} \quad (8)$$

It should be noted that adjustment of the model is considered good by the coefficient Cox and Snell = 0.656 and the coefficient Nagelkerke = 0.683.

3. Concluding Remarks

External effects are observed when supply or demand impose costs or confer a benefit to others. More specifically, the external effect is the impact of the behaviour of a producer or consumer well-being of another, which is not reflected in market transactions.

The economic evaluation of research aimed at improving overall social welfare. As an initial test for social welfare, the criterion used Pareto, under which a fully competitive market, an action or policy is socially desirable if it improves the position of all the individuals composing the society or at least some (weak criterion Pareto), but difficult position of any other (a strong criterion Pareto). Some benefits from the research are as follows: He offered a variety of options that allow the construction of statistical models capable. The number of interviews and the survey costs are lower compared to those required for investigations manifested preferences. However indicated drawbacks, such as the fact that: there was a bias due to discrepancies between stated intentions and actual behaviour of interviewees.

The specimen response on utilization of the rejected biomass was satisfactory, since a good percentage of the interviewees are willing to contribute to this procedure for a minimal of remuneration, although investigations of this type are novel for Greek reality. From this investigation it is perceived by the society the importance of alternative utilization of the rejected biomass.

It is impressive that the majority of the interviewees, i.e., 43 persons who represent 71.7% of the specimen answered that they would allow their gathering and carrying away of their farming leftovers without asking for any monetary remuneration. Further, encouraging are the results concerning the willingness to participate in the gathering since the majority of the interviewees, i.e., 55% of the specimen, stated that they would participate in the gathering of the leftovers without any remuneration.

With regard to the amount WTA (dependent variable) of the Logit Model we conclude that it is affected by the wish for remuneration (independent variable) at the level of importance 5% (p-value = 0.011). We also conclude that the amount of WTA is affected by the stremmas each farmer owns compared to other farmers at the level of importance 10% (p-value = 0.065). Similarly to Probit Model we conclude that the amount of WTA (dependent variable) is affected by the wish for remuneration at the level of importance 5% (p-value = 0.000).

Since education is a crucial factor that increases WTP medium/long term, future research should be aimed at schools, colleges and universities in the region to increase the value of non-use and to obtain useful information related to awareness of young people. Research using the hypothetical assessment has been used successfully overseas and now recognized as a valid argument. The survey can be a powerful tool in the hands of local and regional authorities for claiming generous funding for the purpose mentioned above.

In conclusion, our analysis shows that social science research can provide useful information about the complex issues of environmental policy, such as biomass management. The analysis of policy for such cases is

particularly difficult because these systems provide multiple, interrelated services vary depending on the type of biomass, location and other factors. The work presented here has proved a useful integrated tool for determining the realistic cognitive burden on stakeholders and third parties.

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Feasibility of Developing Crop Revenue Insurance in Chinese Regional Economies^{*}

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Abstract: This paper discusses the significance and feasibility of developing crop revenue insurance in Chinese regional economies. There are three critical factors for successful schemes, i.e., ample regional yield-price information, effective ways of price discovery and extensive public support for regulation and finances. Although there are problems and inefficient, the foundation of developing crop revenue insurance in Chinese regional economies is available, the developing trend is optimal comparatively. We suggest well-preparing regional yield data and price data, complement the value-found function of crop futures market, reinforce the regulation of agriculture insurance fiscal fund, crop insurance can be implemented in some region experimentally, the discussion and preparation of some rules should be actively developed, specified insurance company can try to accumulate and analyze relevant data in order to research and explore the principal of pricing and measure.

Key words: agriculture insurance; crop revenue insurance; regional yield; agriculture futures market

JET code: Q1

As a marketize way to manage risk and society, agriculture insurance played an important role in transforming agriculture development way, promoting rural finance development and innovating rural social management, it has significant potential power in Chinese regional economies. Agriculture insurance is constituted by yield insurance and crop revenue insurance, yield insurance mainly focuses on the uncertainty of agriculture yield, while crop revenue insurance focuses on the farmer's revenue uncertainty due to price fluctuation. In Chinese regional economies, yield insurance is commonly used, and it is basic for agriculture too, thus, the applications and researches for yield insurance are deep, but for crop revenue insurance, the research in Chinese regional economies is comparatively few, there was only one empirical study for certain special crop revenue insurance premium (Jiang Huifei, 2009).

1. The Current Situation for Crop Revenue Insurance in Chinese Regional Economies

Crop revenue insurance is one of the risk management tools for agriculture product, it appeared in Fed

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agriculture insurance plan in 1996, and afterwards, it developed into the one which had the maximum premium ratio size in the global agriculture insurance. According to the data published by American agriculture bureau, until the year of 2010, the crop area covered by the crop revenue insurance, compare with the crop area covered by the whole government supported insurance program, the percentage has raised from 16% to 65% ever since 1997, it became the most popular crop insurance program in the US.

In Chinese regional economies, the agriculture insurance developed rapid in the recent years, now, ever since Chinese policy-based agriculture insurance experimental work enforced from 2004, the premium rises from 4 billion in 2004 to 74 billion in 2011, the accumulated premium revenue is more than 600 billion, cash indemnity is about 600 RMB for every family, which makes around 10% annual income for rural people. In 2011, the agriculture insurance provided risk protection for 1.69 billion rural family, the major grain and oil crop underwritten took 33% percentage for the nationwide sown area, nowadays, there were almost 90% province, city, and district implements agriculture insurance in China. The agriculture insurance size in China has surpassed Japan, only after the US, it ranked No.2 in the world now, it became one of the most important, as well as one of the most active agriculture insurance market in the world (Central Research Institute of China, 2012).

In 2012, Anxin agriculture insurance signed a contract with Songjiang district Disabled Federation, Anxin agriculture insurance brought in crop revenue insurance for the first time for the 32 disabled anti-poverty project located in Shanghai Songjiang district, but the crop revenue insurance has some welfare character, the insurance responsibility and fee ration design are different compare with the US crop revenue insurance in operation model. And what most important is that this crop revenue insurance is not standard enough in calculating revenue according to reference price, it is regional based, not appropriate to adopt in large regional scale, neither for the bigger risk exposure.

The Stability for the famer's future revenue is very significant for organization product, because the stability of future cash flow not only could make sure the lending money and ordering product factor proper, but also much easier to get banking lending for the farmers. Meanwhile, crop revenue insurance could compensate some disadvantage of the yield insurance, such as when there is a harvest; the market price will go down due to the effect of supply, in this case, the famer's revenue may be dropped, not rise, then the yield insurance will not pay for the farmer's losses, but crop revenue insurance could provide corresponding compensation.

Although the yield insurance could deal with the uncertainty of crop yield, the uncertainty of crop price could not be managed, so the uncertainty of farmer's revenue could not be managed effectively either. The indemnity for the farmer in the bad years is in form of cash, even if for the yield insurance, in practical, the premium and indemnity are being transformed into cash amount according to the price for each unit of crop, generally based on the current market price, meanwhile, since the price has market risks, the fluctuation may be larger. As the effect of globalization, the fluctuation for the crop price is conductive, therefore, the fluctuation for the price might be larger than the fluctuation for the crop yield. According to the empirical study during 1975-2004 in the US, the fluctuation for revenue is larger than the fluctuation for yield regardless from the crop type, or from the regional type.

2. The Study on the Precondition Fundamental Questions for Crop Revenue Insurance Implementation in Large Scale Based on Three Major Elements in China

According to the American authorized research, crop revenue insurance regional data global wise and

empirical statistics from multi-nations in the world, in order to make sure the successful implementation of crop revenue insurance, there were three feasible elements: plenty regional yield-price information; effective price found way; extensive and powerful public finance and supervise support.

(1) The problem of whether there were enough crop regional yield and price information in Chinese regional economies

For crop revenue, the comparatively accurate premium depends on the distribution of regional yield, the distribution of price, and the correlation of yield and price. In order to estimate these distributions and relationships, there should be large amount of accurate historical data; otherwise, the error setting data might generate serious strike to the insurance plan. There were plenty regional yield data in Chinese regional economies, the smallest administration unite for China agriculture statistics data is county-level, the county-level agriculture statistics data is been accumulated large amount ever since 1950's, there were also plenty of reference for regional yield modeling and analysis (Yang Xiaojuan, Liu Buchun & Liu Yuan, 2012). But the accuracy of China historical data should be improved. Since agriculture is extremely important in China, the accuracy of historical data should be paid attention. For the agriculture yield data statistics, the further accuracy and reliability should be make sure (Xie Fengjie, Wang Erda & Zhu Yang, 2011).

(2) The problem of efficient price discovery way

In order to confirm the price for crop revenue insurance, a transparent, objective and non-manipulate price index is needed. Otherwise, the two parties to sign the crop revenue insurance could not make agreement concerning the target price. The price index should have 5 characteristics: standardize able, quantifiable, frequent price publish, pricing based on complete competition, could properly reflect the target value. The forward price index happened to meet all these 5 characteristics, it has high-efficient price discovery function, based on this index, the two parties could reach satisfied agreement for both sides (Fu Lei, 2011). Since the three major future exchange markets are been established for nearly 20 years, regulated management for almost 10 years, the degree of marketwise is higher and higher in the recent 5 years, if the future price index is adopted, there were should be certain amount reliable and standardized exchange data information already in Chinese regional economies. But as the future exchange market established comparatively late, regulated management period is even shorter, there could be some problems since the crop revenue insurance calculation is not accurate by these data (Wei Ge, 2011).

Nowadays, the establishment of future agriculture operation model is been explored in lots of region in Chinese regional economies, the new operation models of "corporation+farm", "futures+order form" are established, but according to those "order form" either like forward contract, or future contract, people could only manage the uncertainty of crop price, not guarantee the farmers revenue are not going to loss, and if we adopt the model of yield insurance plus future contract, the coordination of the insurance and future contract, as well as unnecessary steps are added. In this case, we can explore to insure the revenue directly, so that the intermediate cost could be saved, since the complex pricing process concerning the yield is transferred to the insurer, farmers could concentrate to farm.

(3) The problem of whether there were extensive public finance and powerful supervise support

From the current situation of implementation crop revenue insurance, the extensive and forceful public fiscal policy and supervision support is one of the most important elements to success for crop revenue insurance. Generally, since the agriculture insurance has the characteristic of public goods, and agriculture takes important status in national economy, there were policy support systems for agriculture insurance established in many countries. But in case of crop revenue insurance, since it has characteristics and complexity, more supports and

supervision are needed for many aspects like premium subsidy, reinsurance subsidy, public capital using, exposure price index and surety price. Nowadays, the nations and regions which have weaker fiscal policy and supervise support, as EU and Brazil, the agriculture insurance business volumes are declined. Meanwhile, for those countries and regions where fiscal policy and supervise supports are stronger for agriculture insurance, like the US and Canada (Eyberg area), the agriculture insurance business volumes grow rapid. Although there were certain basics for Chinese regional economies agriculture insurance fiscal policy and supervision, and compare with the other countries, only from the premium subsidy, Chinese subsidy standard for agriculture insurance is not low; the degree of attention to pay should be enhanced. Form the observation from 65 nations according to the world bank, the results showed that the average fiscal subsidy for agriculture insurance in the Western countries are 30%-60%, premium subsidy is 44%, at the same time, Chinese agriculture insurance fiscal subsidy has differences according to the regional differences, normally, the agriculture insurance fiscal subsidy would no less than 60%. For example, according to the China Ministry of Finance, the regulation (2012) No. 2 regulates that in the subsidy policy for the current Central fiscal crop farming insurance premium, based on the subsidy of no less than 25% for the provincial fiscal, the central fiscal subsidy for the eastern area is 35%, for the Middle Western area is 40%. In 2008, Jiangsu province in China got the agriculture crop farming insurance subsidy policy for certain insurable type, it regulates that for the variety level of fiscal policy ratio, the subsidy should no less than 70%. Although there were examples above, since agriculture is important for Chinese regional economies, and China has large population size, the average agriculture resource is comparatively less, Chinese subsidy force should be enhanced continuously. Meanwhile, there are differences in regional economic constitution; in the ratio of agriculture output to regional economy gross output, for some region, especially Middle Western region, the subsidy is not enough. There are still many problems in Chinese regional economies agriculture insurance subsidy, such as fiscal subsidy scope is narrow, insurance subsidy way is single, no operation management fee, and tax and reinsurance subsidy.

3. The Way of Developing Crop Revenue Insurance in Large Scope Feasibility in Chinese Regional Economies

Although there were many problems and insufficiency in the three aspects above, the certain basics for developing crop revenue insurance exists generally, therefore, the development trend and the degree to pay attention to should be increased constantly.

(1) The preparation of regional yield data and price data

The agriculture sampling exploration method adopted in Chinese regional economies is cutting and measuring investigate, which is also the most effective way to make sure the accuracy of crop yield data, and it is a common method in the world. Chinese agriculture yield sampling investigate is established in 1962, although several big institutional change and adjustment have been gone though, the basic way of sampling investigate is not changed, the methods of direct investigate, direct informing are not changed. Crop yield data gathering and accumulation are all directly from farmers and land sample. After the samples are been selected, China statistics bureau branches located in different province and counties checked and confirmed, the samples should be fell into places, specifically belongs to which villager group, or which farmer and land. In order to make sure the data quality, China statistics bureau should be able to control the processes strictly from data quality aspect, meanwhile, for all the investigate material, it should be checked and make sure, the post quality checks are necessary.

(2) The price discovery function analysis for agriculture future market

In the agriculture future market in China, the degree of market is comparatively high, for some crops like bean, corn; the price discovery function for the future price is comparatively high (Yang Qinfang, 2009). To adopt the future price index as the crop insurance price index, the most important requirement is that the future price index should be able to develop the price discovery function, which is “according to open, fair, high-efficient, and competitive transaction operation mechanism, the authentic, predicted, successive, and authority price is formed” (Yu Jingmiao, 2011). Based on the index, the satisfied contract for both parties is formed, in which the transaction costs is the lowest, and after signing the crop revenue insurance, the target price agreement could be easily reached for both parties who sign the contract. There were many researches about future market price discovery function in Chinese regional economies, in this essay, three agriculture future price is mainly considered, which is the bean and corn price in Dalian commodity exchanges, the wheat price in Zhengzhou commodity exchanges (Jia Zhaoli, Bai Mei & Wang Haijun, 2008).

According to generalize the main conference about the future price discovery function of agriculture future price for the bean, corn and wheat from 2008-2011 (Table 1), it revealed that in almost all the current conference, the bean, corn and wheat future price have comparatively high price discovery function, but for the wheat future price discovery function, there are comparatively big difference in the research result, in which the conclusion of “the wheat future price has price discovery function” and “the wheat future price has no price discovery function” took approximately the same amount (Wang Chuan, 2011). This result compared with the researches in the early years, the conclusion changed a lot. Because in the early researches, the wheat future price market is in-effective for forecast according to the early researches, the reason is that the wheat related to the national food security, in this case, the government strongly control the wheat price normally, so the wheat future contract price is lack of the market internal promoting mechanism, but in the recent years, the market degree for the wheat price is enforced. So, the writer thought that for bean and corn, the time to take the future price index as the crop revenue price index is coming, while if the wheat revenue price index could be used need next step researches.

Table 1 The Practical Analysis Results for Bean, Wheat and Corn Future Price Discovery Function in 2008-2011 Documents

| Writer and publish time function | Crop | Data Time (Year/Month) | Have/have no price discovery |
|-------------------------------------|-----------------------|--|-------------------------------|
| Yang Qinfang (2009) | Bean Wheat | 2003 / 8-2008 / 4 2003 / 8-2007 / 8 | Have Have but weak |
| Yu JingMiao (2011) | Bean | 2005 / 9-2010 / 12 | Have |
| Ma ShuZhong (2011) | Bean | 2005 / 1-2009 / 8 | Have |
| Chen Li, Duan Jindong (2011) | Bean Wheat | 2008 / 5-2010 / 7 2008 / 9- 2010 / 7 | Have No |
| Wang Xiangming (2011) | Bean | 2006 / 9-2010 / 9 | Have |
| Jia Zhaoli (2008) | Corn | 2004 / 9- 2007 / 10 | Have |
| Shao Yongtong (2011) | Bean | 2005 / 9-2008 / 6 | Have |
| Bao Chunsheng (2009) | Wheat | 2004 / 9-2008 / 7 | Have |
| Wang Chuan (2011) | Bean Corn Wheat | 2004 / 1-2008 / 7 2004 / 9-2008 / 6 2003 / 3-2008 / 12 | Have Have Have but weak |
| Li Yanqiu, Zhou Yong (2012) | Wheat | 2010 | No |
| Wen Yujing, Wu Yuxia (2010) | Corn | 2008 / 1-2010 / 12 | Have |
| Wang Xiaoyi, Chen Qiankun (2011) | Wheat | 2000 / 5-2009 / 12 | No |
| Shen Wenguan (2011) | Wheat | 2005 / 3- 2010 / 5 | Have |
| Wang Rufang (2009) | Bean Corn | 2005 / 7-2008 / 6 2005 / 7-2008 / 6 | Have Have |
| Song Dongying, Wang Jing (2011) | Corn | 2006 / 10-2011 / 4 | Have |
| Chen Shuangsheng, Zhao Cong (2010) | Wheat | 2005 / 11-2009 / 12 | Have |

In China, letting the insurance company as the manager for the crop revenue insurance has significant meaning. Since the intermediaries for China's future agriculture exchanges are mainly cooperatives and food leading entrepreneurs, they are not the specialized risk management institutions, neither do they have sufficient financial management experiences, so they cannot provide the comprehensive service for each farmer considering the revenue insurance. Therefore, letting the insurance company which has plenty of yield insurance knowledge and the insurance company which has financial risk management experiences operate the crop revenue insurance will be a significant complement for China's agriculture industrialization.

(3) The analysis for agriculture insurance fiscal policy and supervision support in Chinese regional economies

The subsidy requirement for crop revenue insurance rates is not high compared with yield insurance. Generally, the rates for crop revenue insurance are comparatively low, but this relationship is unstable, and the differences are comparatively larger in different regions. The rate for crop revenue insurance is generally lower than the rate for yield insurance, but when the correlation coefficient is comparatively small for the crop yield and the crop price, the price factor may increase the fluctuation, then make the final crop revenue insurance rates high. In the US, there were negative correlations for crop yield and price during 1973-2006, and when the crops were planted in larger areas, the price and yield also appeared negative correlation for beans and corn, which means under the same condition, the crop revenue insurance rate may be low for those two crops. According to one certain kind of crop in Chinese regional economies, from the aspect of pure premium calculation, under the 85% coverage, the crop revenue insurance pure premium for corn and beans are higher than the yield insurance premium, but lower than the actual rates of policy agriculture insurance. For the crop revenue insurance operated in Brazil in the early years, the insurance for crop revenue could even develop in an annually 10% rate even without the government subsidy. Therefore, based on the current fiscal subsidy circumstance in Chinese regional economies, the crop revenue insurance should be able to operate.

In China, the degree of support effort and the importance to attach should be further enhanced for agriculture insurance, especially from the government aspect, the corresponding legislation and supervision system should be formed as soon as possible. According to the 2nd Policy 2012 from the Ministry of Finance, based on the current policy from 2012, the Ministry of Finance should enhance the supporting effort for agriculture insurance further, increase the type of insurance premium to subsidy, enlarge the premium subsidy region, support to enhance the overall coverage level. At the beginning of 2012, the China Insurance Regulatory Commission chairman Xiang Junbo indicated that, for the year of 2012, one of the working points to focus on for the China Insurance Regulatory Commission is to promote the development of agriculture insurance, as well as catastrophe insurance, push forward to establish the uniform agriculture system framework in the legal level, meanwhile, catastrophe insurance should be taken into the national comprehensive disaster protection system.

Actually, early in the year of 2007, China initiated the "policy-directed agriculture insurance rule, and in the May of 2012, the State Council published "agriculture insurance rule (suggestion requiring version)", at the same time, the ideas and suggestions were collecting in the society. In order to work in with the suggestion requiring version, the China Insurance Regulatory Commission was working on the formation of "agriculture insurance supervision temporal method", which proposed the corresponding supervision requirement and regulation rule. Therefore, during the Twelfth Five Year Plan, the two system ordinances mentioned above will be implemented, the agriculture insurance should be ensured from the aspect of institution support. From all what mentioned above, it is obvious that Chinese government strongly supports the agriculture insurance. For the crop revenue insurance,

the object price index and the supervision of guaranteed price are significant factors, since those questions are more technical, the initial of basic agriculture insurance system, should further carry out and improve the insurance target price index, as well as supervise the surety price.

In summary, as there are plenty regional yield data, certain quantity reliable and standard agriculture futures exchange data, bean and corn futures have comparatively high price discovery function, the foundation of fiscal and supervision supports has exists. Since the support effort and the degree to pay attention to are significantly enhanced, China has the foundation to carry out the agriculture crop revenue insurance in large scale, at least, for the first step.

4. Conclusion

Agriculture insurance is one of the significant pillars for Chinese agriculture industrialization, developing agriculture crop revenue insurance means more for the farmers than the agriculture yield insurance and the agriculture future in Chinese regional economies. The crop revenue insurance could provide reliable insurance protection for the farmer's revenue, and ensure the farmers with stable future income, only after the farmers get stable income, can they loan easily and focus on the production, then they can get the credit from the banks, which ensured they focus on the production further more. The powerful development of the crop revenue insurance will affects the agriculture economic a lot, and strongly pushes the insurance industry innovation.

According to the feasibility analysis for the three elements to develop the crop revenue insurance in large scale in Chinese regional economies, although there are questions and shortages exist in the above three elements, generally, there are certain foundation, and the development trend is comparatively optimal. In China, there are plenty regional yield data, certain quantity reliable and standard agriculture futures exchange data, bean and corn have already got comparatively high price discovery function, agriculture insurance fiscal policy and supervision support has certain foundations, at the same time, the support effort and the degree to pay attention to have enhanced, in this case, the writer suggests that for some part of region, certain kind of crop, like bean, corn, to initial the experimental work, meanwhile, actively develop corresponding system rule, explore and prepare it, push forward the development of related data accumulation and analysis, encourage corresponding pricing and econometrics theoretical foundation research and exploration.

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